The Orchadian

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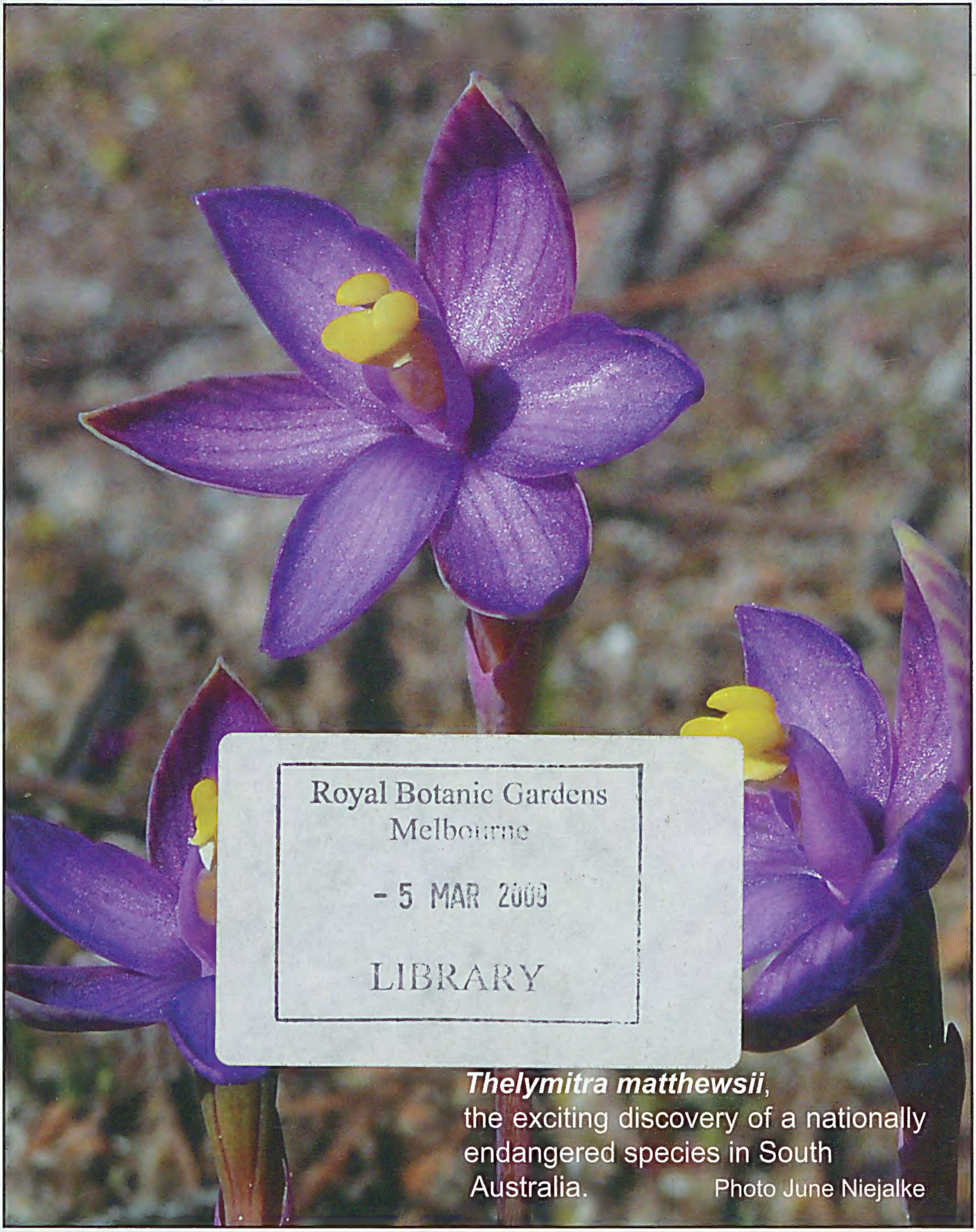
Official Journal of the Australasian Native Orchid Society



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Thelymitra matthewsii, the exciting discovery of a nationally endangered species in South Australia. Photo June Niejalke

The Orchadian

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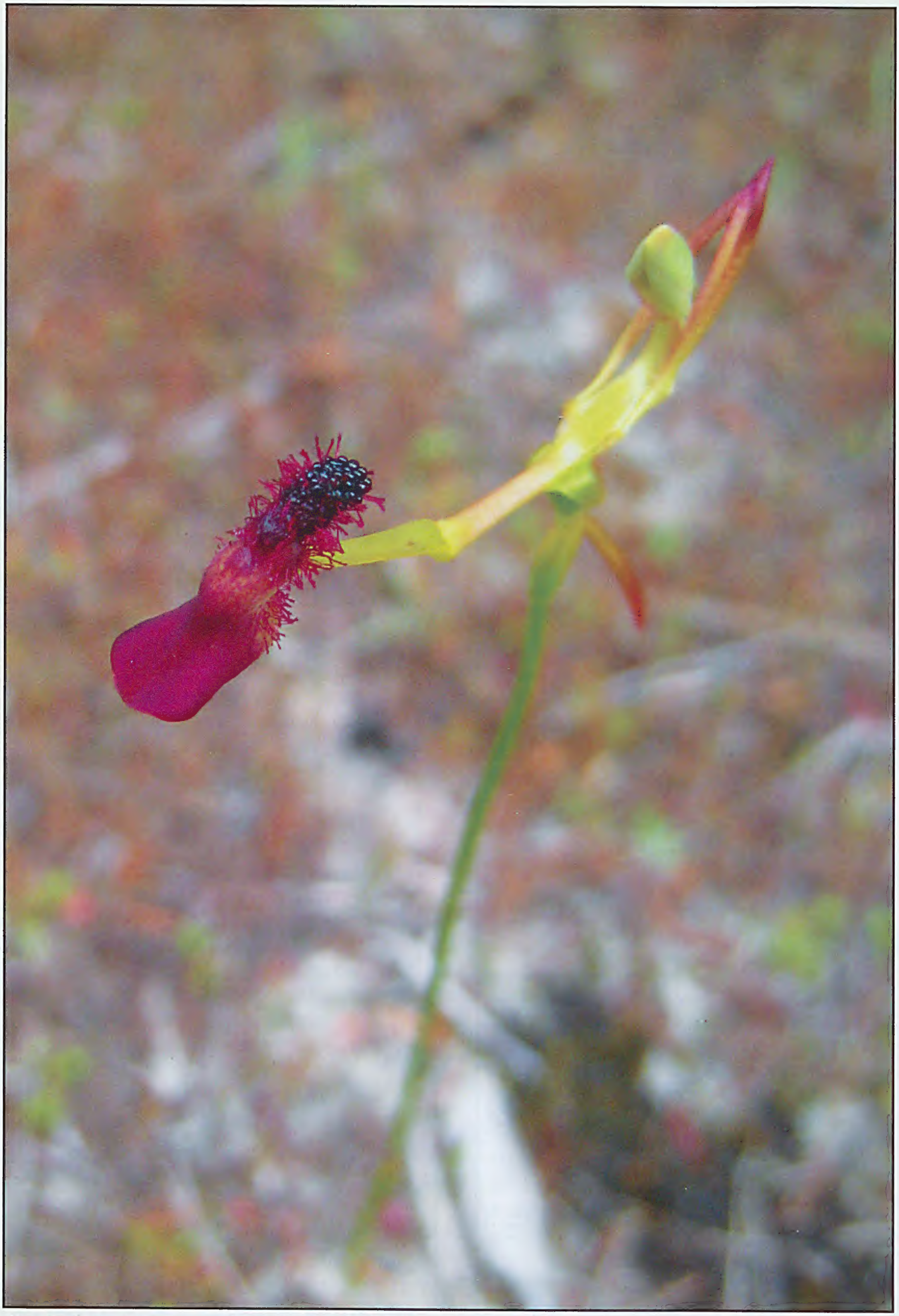
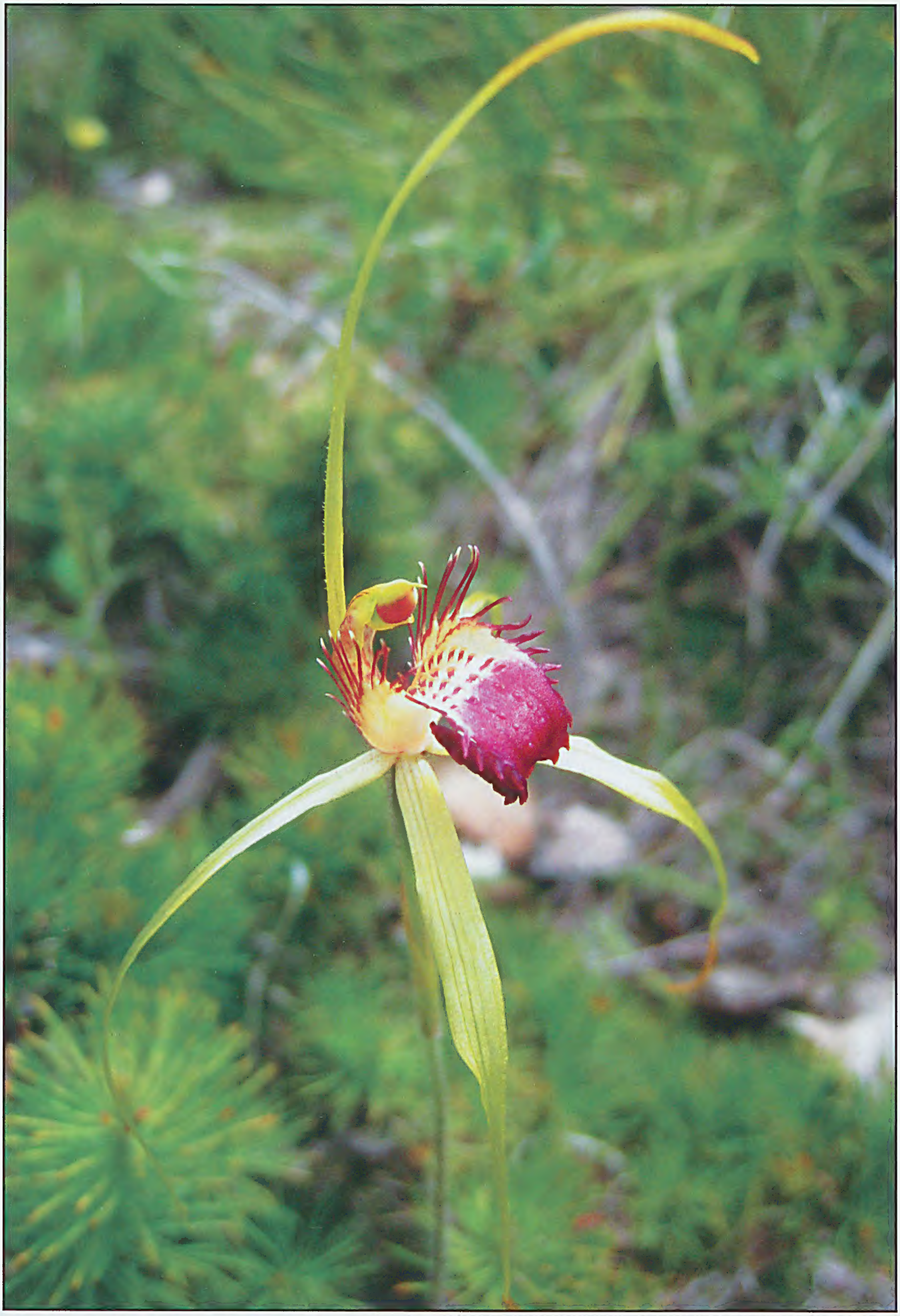


Drakea elastica, an endangered species from Western Australia. Photos Graeme Bradburn



Arachnorchis viridescens, an endangered species from Western Australia.

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Editorial

As I put the finishing touches to this issue and write this Editorial, I have been watching the horrific bushfires of Victoria on the television, as many of us have. There are well over 600 members in our Victorian Groups and many subscribe to *The Orchadian*, and I recognise some of the towns from our mailing list. It would be hard to believe that our Victorian colleagues have not been affected or touched in some way by these fires, so on behalf of ANOS Council and all the members I would like to let our Victorian members and indeed all those affected by the fire, know that our thoughts are with you.

6th Australasian Native Orchid Conference and Show will be hosted by ANOS Newcastle Group in 2010, 25th to 29th August at the Newcastle Panthers Club. To raise funds for the conference, Newcastle Group are holding an auction, details on opposite page, Brian Gerhard from DUNO, is the auctioneer and for those who have attended the Manly Warringah Orchid Society auctions will know how efficient and entertaining Brian is. There is a large number of very desirable plants being auctioned and the hospitality of Newcastle Group will ensure this will be a great day to attend. See you there!!

In this issue there are some great articles again Alan Stephenson tells of some conservation projects, David I. Jones and Paul Ormerod describe some new orchids and Phil Ritchie has put together a great article on orchid mycorrhizal fungi and epiphytes, a very interesting read.

Again I could not help myself in writing about some Western Australian Spider Orchids and some of the other curious species we saw when visiting there.

Again you will have received the renewal notice with this issue, so please remember to pay it on time or you will miss out on receiving next years issues.

Peter.

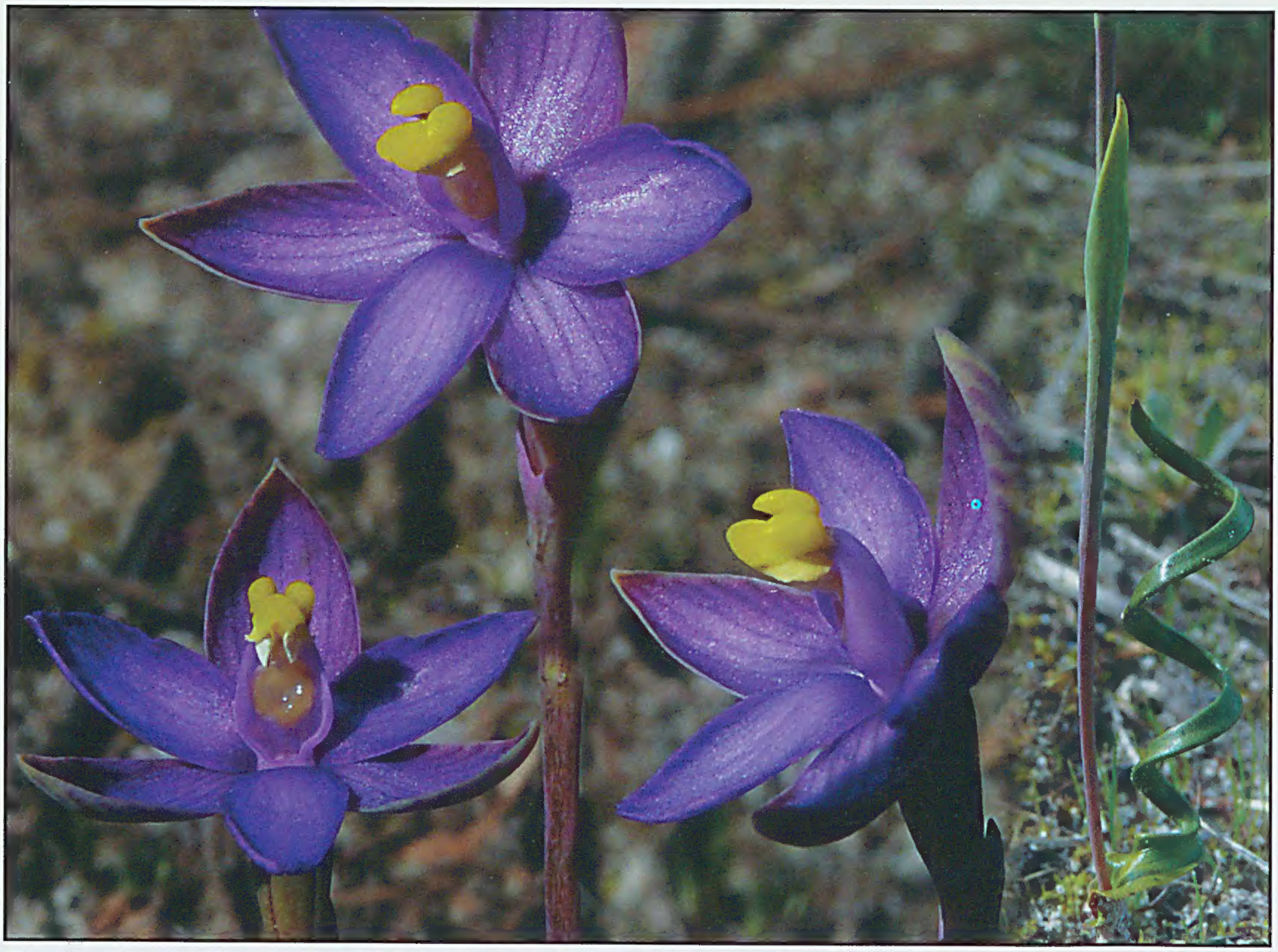
Some more Western Australian Spider Orchids.

First I have to apologise to Bob Liddelow for spelling his name incorrectly in my last article. Sorry Bob! But armed with his book we headed south to Bunbury, from Perth. At one of his sites we soon realised how plentiful *Caladenia flava* is in Western Australia and how wonderful some flowers are with all the red markings. We also found the beautiful flowers of *Arachnorchis speciosa* in bloom.

While we were staying in Bunbury with Phil Bunney, we were fortunate enough to have the opportunity to visit a the private property of the Harwicks'. Here we were lucky enough to see and be able to photograph *Drakaea elastica*, a rare and endangered orchid species. Other orchids on their property we photographed were *D. glyptodon* and *Sullivania nigrita*. At different sites during the day we occasionally came across *Arachnorchis macrostylis*, the Leaping Spider Orchid, with its' large calli on the labellum.

When we Graeme and I left Phils' we headed of to see what we could find and with Bobs' book mud maps from John Ewings, we found another rare and endangered orchid, *Arachnorchis viridescens*, the Dunsborough Spider Orchid.

It didn't matter where we stopped we always found some orchids. When I went over it was my intention to find as many of the orchids I had on a list. We came across nine of the top ten, so that's not bad for a week of searching. Some I had no doubt I would see others were just amazing luck. So when I return there will be definitely one more I will need to cross off. In the next issue I will have some more tales and photos of the rest of the top ten. Special thanks to Alan and Graeme for their photos. Peter



Thelymitra matthewsii, Spiral-leaved Sun-orchid. Nangwarry. Photo Barbara Bayley

Alan Stephenson presenting Life Membership to David Jones on behalf of ANOS Council at the ANOS Victoria Group December meeting. Photo Alex Wild.

David L. Jones – ANOS LIFE MEMBERSHIP

Many people make contributions to the betterment of the knowledge and appreciation of native orchids. Few however contribute to the extent of the recipient of this award. The contribution is not limited to simple taxonomy, if taxonomy could ever be termed simple but an obvious ethic was developed which has been apparent for many years. My personal knowledge of him assures me he likes the involvement his work has given him in the office and in the field but I know he does not appreciate dealing with a bureaucracy or those who have a tendency to vacillate or procrastinate.

David has had a lifetime affinity with native orchids and other plants and began a deeper involvement after completing degrees in Horticulture and Agricultural Science at the Burnley Horticultural College and Melbourne University.

He initially worked at the Knoxfield Horticultural Research Institute and here implemented innovative programs into the study of native plants, particularly their nutrient needs.

The writing career began in 1968 when he co-edited with Bruce Muir the complete collection of W H Nicholls manuscripts and watercolours, culminating in the publication of *Orchids of Australia* prior to the World Orchid Conference in Australia in 1969.

That same year David became a foundation member of ANOS Victoria and also a committee member. A few years later he was honoured with Life Membership. About this time David with wife Barbara established *Geewan Ferns* at Montrose.

In 1973 David described his first orchid, *Corybas hispidus* now known as *Corysanthes hispida* but that was just the beginning.

In 1987 he joined the Australian National Botanic Gardens as a research officer evaluating in his first year the viability of 40 horticultural projects, later successfully proposing to management a change of direction for him to focus on taxonomy of little understood plants but mainly native orchids. This change saw a significant increase to the National Herbarium reference collection and the introduction of new techniques necessary for the study of these plants. Part of this work saw the establishment of an Australia wide network of professional and amateur botanists and enthusiasts with whom David liaised to obtain fresh and new plant material for study. The use of this network accelerated searches and studies relative to native orchids and other plants. David also began the first of many botanical drawings and illustration now number close to 3000.

October 2001 saw the presentation to David of the AOF "Award of Honour" in recognition of his contribution to native orchids and orchids generally.

This work has culminated in the description and naming of over 300 species and several orchid genera. It has also seen the publication of 25 or so books, either individually or in conjunction with his wife Barbara or with his colleagues, most notably Mark Clements. I also believe there are at least two more publications pending, so the work ethic and the interest have not yet diminished.

David, has the respect and admiration of all native orchid enthusiasts. The Australasian Native Orchid Society is indebted to David now and I expect we will be for many years to come.

Alan Stephenson,
ANOS Council.

Exciting discoveries of the nationally endangered sun orchid *Thelymitra matthewsii* Cheeseman in two separate regions of South Australia in 2007 and 2008.

R. Bates, K. and B. Bayley,
C. Houston and J. Niejalke

Thelymitra matthewsii, the Spiral-leaved Sun-orchid was first described in 1911 from plants collected in Mongonui County, New Zealand by amateur botanist R.H .Matthews. The species was named in his honour.

The same species was redescribed in 1930 by Dr RS Rogers as *Thelymitra daltonii* from Australian plants after being discovered by C. W. D' Alton in Victoria's Grampians in 1922. Rogers later realised his mistake and reduced *T. daltonii* to synonymy.

T. matthewsii was found in South Australia in the 1960's by Doreen Hunt in the South-east near Willalooka and Messent and on Kangaroo Island by Ida Jackson and by Rob Bates near Kuitpo in the Adelaide Hills in the 1970's and again by Bates on Kangaroo Island in 1992 when a single plant was found in Flinders Chase after a bushfire.

By 1995 all South Australian populations seemed to have disappeared. The species had occasionally been reported from Western Australia but Jones (2006) and Backhouse and Jeanes (2006) reject it from that State.

By 2005 *T. matthewsii* had been declared as a threatened species for Australia as it was known only from small populations at a handful of sites in southern Victoria and the Grampians. It was considered even rarer in New Zealand. Some thought it to be possibly extinct in South Australia. The Kuitpo population had been ploughed up and planted to pines and despite thousands of man hours spent searching by enthusiasts no plants were found at previously known sites. Climate drying convinced many that it would never be seen again. Jones (2006) gave us some hope by reminding that the species flowered best after bushfires or disturbance and could not be expected to flower every year.

Then in 2007 there came a breakthrough!

As reported by Andy Young in the October 2007 edition of the *Journal of the Native Orchid Society of South Australia*, a colony of spiral-leaved Sun-orchids was found on Kangaroo Island by the Island's resident botanist Bev Overton and Trish Mooney from the Department of Heritage and Environment. The actual location has been withheld but it is in a conservation reserve on the north-west coast not far from the original discovery by Ida Jackson. Young noted that he and others searched the area and found 22 plants growing along a cleared path on lateritic soil and that a bushfire nearby had allowed ash to wash into the site. Hence it could be observed that both the requirements suggested by Jones had occurred. Only 2 flowers were found but the whole picture was about to change!

The 2008 breakthrough!

A planned orchid survey by NOSSA members of more than 90 000 hectares burnt on Kangaroo Island in late 2007 did not take place due to lack of funding but luckily Forestry SA, based at Mount Gambier in the State's South-east region offered NOSSA funding to carry out an orchid survey in one of its forestry reserves over three months from August to October 2008.

With a dozen members walking firebreaks

recording orchid species in August amateur orchidologist June Niejalke (with Dianne Richman) found several spiral sun orchid leaves with single buds and called us all over. The 'experts' confirmed that her find was *Thelymitra matthewsii* and by the end of the day over a hundred plants had been counted. Troy Horn of Forestry SA advised that maximum protection would be afforded the population.

Flowers opened in late August and during the September leg of the Survey over a hundred more were located on several tracks. All plants seen were on slashed heathy woodland in leached sandy or sandy-clay soils. Flowering continued for more than four weeks. Plants were single or had formed small clumps of 2-4 plants. No plants had more than one flower. Flowers opened in temperatures as low as 15 degrees Celsius but were more prolific in sunshine and at higher temperatures. All flowers were self pollinated as pollinia collapsed onto the stigma even if blooms stayed closed.

No hybrids were observed and the only other sun orchid species in the area to flower by the end of September was the yellow *T. antennifera* and these were several hundred metres away. It was tempting to transfer pollinia by hand to see if the resulting crosses might produce *T. mackibbinii* but this was not done.

(*T. mackibbinii* was once listed from South Australia but the collections labelled as such in Melbourne proved to be something else and *T. mackibbinii* has been deleted as a South Australian taxon.).

Management of the populations will continue as at present with slashing of the firebreaks done after seed release in November. Ploughing will not be allowed but some additional slashing and mosaic burns may be carried out in adjacent native vegetation. Horses have occasionally trampled the plants and their hoof prints were still evident at the time of our survey but signs will advise of horse riding restrictions in future. The area is largely weed free except where ploughing occurs in damp areas.

Summary:

This new population, estimated at 500 plants represents the first record of *T. matthewsii* in the lower South-east district and appears to be the largest population in existence. Dr Mike Duncan who has written recovery plans for the species notes that until this new population only about 850 plants were known in the World. Its discovery gives hope to the future of rare flora in South Australia as although annual rainfall has declined by as much as 20% since the 1950's (which is only slightly less than most forecasts of long term rainfall decline) species such as *T. matthewsii* are still holding on.

* Curiously a single plant was seen in pod in the burned out Ravine de Casoars Wilderness on Kangaroo Island in October indicating that there may be populations there too.

* The actual localities have been withheld for security reasons.

References:

Clements M.A. (1989) *Catalogue of Australian Orchidaceae*, Australian Orchid research Volume 1.

Jeanes J. and Backhouse G. (2006), *Wild Orchids of Victoria,(* Aquatic Photographics, Victoria)

Jones, D.L. (2006), *A complete guide to Native Orchids of Australia*,(Reed Australia).

Young, A. (2007), *Thelymitra matthewsii Rediscovery on Kangaroo Island,* J. Native Orchid Soc. S. Australia, vol 31. page 76.

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Lessons in the key of (environmental) life.

Since I first accepted the position of ANOS National Conservation Officer, following on from the good work of Alan Dash, I had no pre-conceived thoughts on how to undertake the position, however I did expect to learn a few things along the way. Some of these lessons have been enlightening, others have been confronting, disappointing and even embarrassing.

Quite some time before becoming officially involved I wrote my first environmental report. It was 1995 and in the then Shoalhaven Shire (now city) a proposal was being prepared for a large landfill facility, allegedly for local waste. Initially 32 sites were nominated from desktop surveys of topographical maps and later these were reduced to five, with an Environmental Impact Statement (EIS) to be prepared to select a final suitable site. The sites averaged 1000 hectares and most were in the coastal geographic centre of the shire. After the EIS was completed I was shown a blurry photo of a plant said to be an orchid and it aroused my interest. With a group of locals I visited the site and was pleased to note the orchid was *Calanthe australasica*. Later when shown a copy of the EIS I was horrified to learn very few orchids were listed within the report. I wondered how any reasonably observant person could walk over 5,000 hectares of bush land and not see much, particularly as *C. australasica* is an evergreen terrestrial species with leaves measuring up to 150 mm x 900 mm. My visit to the site uncovered 19 species of terrestrial and epiphyte within 30 minutes. I was aghast at how this could be allowed to happen but the local population showed tremendous resolve and through a series of blockades and political action this area is now a National Park and no waste facility will be constructed. The reason I became involved in 1995 and later on a more formal basis, was that I realised immediately a government could damage or destroy something of listed value with immunity, whereas the rest of us would be prosecuted. A case in point was with the construction of a Leisure Centre at Vincentia where nine individuals of *Prasophyllum affine* were knowingly destroyed during initial earthworks for site preparation and I found it quite galling the number of destroyed plants was so well recorded.

These events I learned were reasonably common where surveys have been undertaken at the wrong time to locate a known endangered species or not bothering to formally identify an orchid beyond *Prasophyllum* sp., despite the specific requirements of state government authorities at the time. The first lesson I learned was that some of those who undertake this work have little knowledge of orchids. Most are good with general vegetation, weeds, mammals, reptiles and birds but orchid knowledge is sadly lacking. This has been reinforced many times as in the past few years I have been asked by at least four companies doing this work to identify orchid species or also what is flowering at this time and where can we find them? My assumption has been that some surveyors are awarded work to provide a positive and expected result for the employer.

A common thread through the environmental process is the first thoughts of many developers. This thought relates to the discovery (usually unexpected as per the previous paragraph), of a rare or endangered orchid on the site and the stated expectation that "not to worry we can dig it up and re-plant it somewhere else, anywhere else, so long as it is not on this site." Often ready to recognise and re-enforce this line of thought is a government, usually at local or state level, eager to see something constructed to provide the jobs associated with a development. Often these jobs are illusory and applicable to a small section of the job seeking population. They come as temporary/casual positions in the retail or hospitality industry, well known for their low wages. This is the part of the process where political decisions frequently outweigh environmental considerations. Politicians are in fact the worst enemy of environmentalists as they are responsible for all policy determinations and have a better understanding of the intricacies of the legislative process, with an army of bureaucrats unavailable to most. The cost of tax incentives and subsidies available to the development industry are never counted where jobs are concerned but in the rush to develop and provide jobs, one must ask, how much these jobs will cost, financially and environmentally in the short term and long term. A minister in a previous government said to me "all developers are good blokes these days aren't they?" I almost choked as I fell out of my chair. On that same day another politician made the statement "if it comes to a vote between orchids and jobs, I will vote for jobs every time." The particular development about which that statement was made (three years ago) has not yet provided one permanent job and in the current economic environment it could be a long time before any job is assured.

Some bureaucratic anomalies can be catastrophic and I learned recently a low level employee in a certain NSW government department can order a burn-off of a forest area containing orchid species listed under NSW and federal legislation without consulting a senior officer. This potentially devastating initiative is matched by the lack of understanding of habitat diversity within the wide variety of land forms throughout Australia, particularly so when the phrase "it's just another patch of bush" is thrown about by those whose next original thought will be their first. Frequently these are the same people who use another greatly overused phrase "environmentally sustainable."

Another problem with which I have bitter experience, is how easy decision making can be from the comfort of the office chair, with total reliance on a report by someone mentioned in paragraph three.

The desire for governments to get re-elected has witnessed some odd political affiliations. In NSW the Shooters Party has supported the current government for several years on a range of issues and in return has been given access to several areas of State Forest, allegedly for the purpose of ridding those areas of feral animals. This of course is little more than a back scratching exercise in return for legislative support. I shudder when I think of a party of hunters armed with guns, bows and arrows and dogs trampling all and sundry in their efforts to rid an area of feral animals. No doubt many of these unwanted animal intruders are properly despatched but how much damage can be attributed to exercises of this type, is this considered and is it measured only in terms of kill rates? I recently discovered two hunting arrows in a local National Park although whether these can be attributed to a member of the Shooters Party is impossible to say.

A similar situation is present in Queensland where the horse riding fraternity have access to certain areas of selected National Parks. Following a recent letter to the Queensland environment minister, the response indicated this was a trial with several conditions and will be monitored. My feeling is, if a report resulting from this trial ever sees the light of day, I will truly be astounded and who will monitor this trial to ensure compliance.

Governments at all levels have numerous ways of outmanoeuvring the environmental legislation they have enacted. In NSW the use of Part 3A of the Planning Act hands control for development declared "Critical Infrastructure" to the planning minister and overrides all environmental concerns. I think it odd to have an environmental minister play no part in a development where there are glaringly obvious environmental concerns. Readers of this publication will be aware the road by-pass of Bulahdelah and the Stockland development at Vincentia are just two matters of concern. With this and other "Critical Infrastructure" projects the Department of Environment and Climate Change (DECC) can offer advice to the Minister for Planning but there is not obligation, either legal or moral, for the minister to heed or act upon that advice. There are two sections pertaining to Part 3A but the major section has been made unchallengeable in court by the NSW government and unfortunately this is the section which is most used.

Tasmania also has similar concerns and as a state dominated by logging, it is significant the application of the Regional Forest Agreement (RFA) takes precedence over state and federal environmental legislation. In 1998 when the RFA came into being, a determination was made to ensure logging would continue in an almost unfettered manner. Some areas of state forest were designated to logging while others were transferred to areas of protection. However, problems arise when state and federal threatened species are found to be within the boundaries of a logging coupe as they are not entitled to and do not receive the protection for which the Commonwealth *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act) and the Tasmanian *Threatened Species Conservation Act 1995* (Tas TSC Act) were designed. A recent example is the logging being undertaken in Coupe BG034A near Railton. An orchid species, *Speculantha atriola,* was located within the logging coupe but is now undergoing a trial. This trial includes marking out 10 metre square plots, some containing *S. atriola* and others without the species. Logging will be conducted as usual and an inspection will be carried out following the conclusion of operations to assess the impact of logging on the orchid and its habitat. The machinery used will not undergo any changes and will the same as used for any operation of its type. It seems to me this is the type of trial only a logging friendly government would contemplate. The influence of logging on a succession of Tasmanian governments is legendary (or should I say notorious) and more than one Tasmanian Premier has lost his position for a perceived undue closeness to a particular timber oriented company. Indeed one is now a senior executive with that company.

Western Australia cannot escape attention as the plans for an extension of the Jandakot Airport undergo scrutiny. With the desire not to pre-empt a final decision, the work done by the W.A. Native Orchid Study and Conservation Group and the Friends of Ken Hurst Park has been excellent, however one part of the process gives me cause for concern. When first proposed, the expansion plans included Ken Hurst Park, which is listed as a “Forever Park.” I wonder what part of forever does not apply to those planning to add and extend runways and service buildings. With this in mind I wonder how this and other developments can proceed as far as they do when developers are faced with state and federal conservation legislation and such things as a “forever” park. They obviously feel they have a connection to a government and feel that if the promise of development will bring jobs they are home free. Airports in particular are said to be job multipliers as they are directly linked to the tourist industry, which provides hotel rooms and associated jobs and the ripple effect can be felt throughout the state and the country.

For any person sufficiently interested in becoming involved in this type of exercise I hasten to add, be prepared for a long battle as the development industry has the ear of governments across Australia and sufficient funds to wait out and frustrate any person or group which they see as even a minor threat to their plans. I write this article with the first hand knowledge of all you have read to date but to whet the appetite of budding conservationists a list the state and federal agencies responsible for conservation policy and management appears below. At the time of writing these agencies were correct but these agencies change name and responsibility more than just occasionally, so be prepared to check state and federal government websites. I urge all those already involved in orchid conservation or those contemplating such action to be aware of what these departments are, what they do and the ministers responsible for their legislation. Be prepared to write letters as occasionally some get through and a result (albeit usually minor) is most gratifying.

These are the lessons I have learned in the few years I have been directly involved in orchid conservation and the only thing which I can guarantee is that more lessons lay ahead and some of them are certain to be painful.

New South Wales: Threatened Species Conservation Act 1995 - Department of Environment and Climate Change

Queensland: Nature Conservation Act 1992 – Environmental Protection Agency

Victoria: Flora and Fauna Guarantee Act 1988 – Department of Sustainability and Environment

Northern Territory: Environment Protection Authority Act 2007 - Environment Protection Authority

South Australia: National Parks and Wildlife Service Act 1972 – Department for Environment and Heritage

Tasmania: Threatened Species Conservation Act 1995 - Department of Primary Industry Water and Energy

Western Australia: Environmental Protection Authority Act 1986 – Environmental Protection Authority

Australian Capital Territory: Environment Protection Act 1997 – Environment Protection Authority

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The Native Orchid Society of Toowoomba Inc. 40th. Anniversary.

The Native Orchid Society of Toowoomba Inc., will celebrate their 40th. year of operation this year during July – October. The main feature being the Spring Show held during the Toowoomba Carnival of Flowers, in September. The show committee are in process of finalizing arrangements for this event, and further notice will be announced in due course.

The story of NOSTI. .... And its place in Toowoomba's history.

Beginnings:

By 1962/63, in Sydney, a small group of native growers, led by Mr. Bill Murdoch, formed this country's first native orchid society ... to be known as "The Australasian Native Orchid Society" ... (ANOS.) ... devoted to the conservation and cultivation of orchids endemic to Australasia, which in addition to Australia, includes Papua New Guinea, New Zealand and some Pacific Islands. (There are now many more Societies). At the same time, interest in enjoying these beautiful orchids in the bush, and attempting to cultivate rescued plants at home, was also occurring in the Toowoomba area.

The person responsible for initiating the formation of a local branch of ANOS. was Mrs. Hilda Poxon. "H.P."'s (as she was affectionately known) specialty was Australian native orchids. To this end she would spend weekends in the company of those other stalwart lovers of native orchids, as they roamed the hills and valleys of the Toowoomba area searching out the habitats of our native orchids. Hilda had the foresight that a club should be formed in Toowoomba to cater for growers of Australian native orchids.

In May 1969 a public meeting was organized by Hilda, assisted by two others, inviting the ANOS. Public Relations officer Bill Murdoch of Sydney to attend. The first meeting of the branch of ANOS. was held on 3rd. July 1969. ... 30 people attended ... It was decided to name the branch "ANOS. Darling Downs Group".

In 1988 the group became incorporated and the name was changed to "Native Orchid Society of Toowoomba Inc.". ... commonly known as N.O.S.T.I.

To honour Hilda's commitment to native orchids, encouragement of young members, and initiation of the formation of ANOS Darling Downs Group/NOSTI. she was elected to Life Membership of the Club in 1977. ... To further cement her place in the history of Australian native orchids, a native hybrid, a crossing between *Dendrobium speciosum* and *Dendrobium tetragonum* was registered as *Dendrobium* Hilda Poxon.

Two foundation members, Mick and Bernice Fletcher, who played a very active role in ANOS. and for many years were NOSTI's Patrons. Sadly, Mick passed away recently.

Further information on the naming of *Dendrobium* Hilda Poxon:

It was registered in 1977, by Dr. Noel Grundon, a Toowoomba-ite, (now residing in Atherton) saw fit to further cement Hilda's place in the history of Australian native orchids. It was therefore fitting to name the crossing, (*Dendrobium speciosum* x *Dendrobium tetragonum*) as *Dendrobium* Hilda Poxon, in recognition of "HP"'s life long devotion and commitment to Australian native orchids. Many of you native growers will no doubt have the plant *D.* Hilda Poxon in your collections. The crossing has been done many times, using some superior clones, resulting in spectacular results.

NOSTI. was host in organizing and staging the 2nd. ANOS. Australasian Native Orchid Conference and Show in Toowoomba.

Athol Rosenberg,
e-mail: athnan@iprimus.com.au
Show Secretary,
Native Orchid Society of Toowoomba Inc.

Some inspiration and some perspiration.

As many ANOS members would know, ANOS Inc has been involved in the very wide ranging study regarding a terrestrial species listed as Vulnerable under the Commonwealth EPBC Act and the NSW TSC Act. This involvement has been mostly in the provision of information regarding locations other than those recorded on the NSW Wildlife Atlas. The species is *Cryptostylis hunteriana* and a firm of Environmental Consultants called Bangalay Botanical Services have been awarded a grant by the NSW Environmental Trust to find out if a preferred habitat for *C. hunteriana* could be determined using a scientifically based Multi-Variate Analysis system. This method involves visiting all known sites for the species, locating and recording any individuals of *C. hunteriana* which are in flower at the time and recording in detail the landform, soil type and vegetation at all sites. Ultimately all data will be analysed and a report written, which is expected to indicate whether the preferred habitat for the species can be predicted to a degree of certainty. Members of ANOS Victoria have conducted surveys in and around areas where *C. hunteriana* is known or thought to occur and ANOS members from the NSW Central Coast and Hunter regions have also assisted with similar information. This is a case of looking after our own interests; despite the fact this species is not in general cultivation.

Cryptostylis hunteriana is a saprophytic species and this means plants have no basal or stem leaves and rely totally on a mycorrhizal association with surrounding vegetation for their survival. From personal experience I have found *C. hunteriana* to be probably the most difficult species for which any person could undertake a survey, whether paid or otherwise. This is not only because the vast majority of plants situated in the Shoalhaven are small, varying from 15 cm to 45 cm, with a few taller plants thrown in to confuse the issue but also because of known plants at Bulahdelah which have been measured at 110 cm. Flowers of most Shoalhaven plants are also small with the petals and sepals merely very slender, almost insignificant appendages. The labellum is the major feature of the flower and is the feature of the plant first noted when any plant is located. The plants in some areas of Vincentia are usually of the minimum size mentioned with few flowers (3-5), with a labellum of 4 mm x 15 mm and frequently the top flower does not manage to open before the plant begins to fade. The difficulty with locating *C. hunteriana* is the indifferent manner of its flowering habit. It is well known to flower on a site for one year and not be seen at that site for a decade and for this reason is an extremely frustrating species to locate on a regular basis. However with a concentrated study of this species currently underway by a known orchid authority, I would expect some of these unknown aspects of *C. hunteriana* will be revealed in the not to distant future.

To highlight this contrast, an individual plant I located in January 1999 at an altitude of 600 m was apparently the first recording of *C. hunteriana* at that altitude as all other known plants at that time had been located much closer to sea level. This incidence was sufficiently rare for two officers from the then Threatened Species Section of National Parks and Wildlife Service, (now Department of Environment Conservation and Climate Change) (DECC) drove from Queanbeyan (240 km) to verify and record the discovery. After several hours of searching through dense vegetation this was the only plant recorded and despite visiting the site each year I have not seen any individual of *C. hunteriana* in flower since the initial find. On the other hand a population was located at Vincentia (sea level) about three years ago and so far it has provided a great number of flowering plants each year since. Many of these on this site are among the taller and better flowered specimens. I must also note this species is known to have a single flower open at any one time although occasionally one will be open fully with another probably close enough to say two flowers are open. I use this colony as a test site to determine if any plants of *C. hunteriana* are in flower each year before wasting my time scouring the scrub during the heat of summer looking for something which may not be available. I undertake random searches for this species not only because it is listed as Vulnerable but because it is difficult to locate and not many plants enjoy the security of a reserve or National Park.

As part of the ANOS input to the process of the grant surveys I have accompanied Steve Chamberlain on two occasions, either showing him *C. hunteriana* sites known to me and also several others which are recorded on the NSW Wildlife Atlas. On the 19th of December I showed him three sites where *C. hunteriana* occurs and he spent some time at each site with a GPS recording all visible plants and the details of habitat as mentioned earlier. In the meantime Steve had been recording details of *C. hunteriana* in North East Victoria and a few other sites in NSW. He also had details of plants in the Bendalong area and near Ulladulla but for two other sites Steve requested my assistance. To say the least these were difficult sites as one was on a plateau where the only access is by a rugged fire trail, with which I am quite familiar. It runs parallel to the Princes Highway south of Nowra ending at Braidwood Road near Tianjara Falls. If you discover this track do not attempt it without four wheel drive and also not after heavy rain. The plateau is 700 m above sea level surrounded by dense and occasionally prickly scrub and as we climbed up to the escarpment I expressed my doubts as to the veracity of the record of occurrence. Reaching the top we noted dense ground cover with occasional sheets of bare rock and the only flowering plants of interest were a few individuals of *Blandfordia nobilis*, (Christmas Bells). Steve had a GPS point for the site and it was 30 m over the cliff on the SE side and we thought it more likely to house *Dockrillia striolata* or a similar species. Naturally no plants of *C. hunteriana* or any other orchid species were located but detailed recording of habitat was undertaken as a matter of course.

After this strenuous effort in plus 30°C heat we followed another track back to the Princes Highway down the escarpment under some magnificent sandstone over hangs to Mt Kingiman where three other locations had been recorded. As the NPWS gate was across the access track we were forced to walk down the hill to check the first record. Using the GPS we were required to walk 600 m off the track into dense bush, down to a creek and rain forest gully, not quite what one would expect as a site for *C. hunteriana*. By this time it was late and as there were three records to check we decided to call it a day and return at a later date to record the habitat. I must add, these sites are listed on the NSW Wildlife Atlas but this amateur and at least one expert considers them to be unlikely to support a plant or population of *C. hunteriana*.

Some of the vagaries of *C. hunteriana* are known to any person who has seen a colony or plant in one location, returned to that location the following year expecting to see that plant in flower again only to be disappointed as flowering plants might not occur for a decade. Plants I found in 1999 have not flowered since that date. One other site on which all plants in a colony numbering 60 are also varied in their flowering habits, as I have noted them to flower poorly in a year of good rainfall contrasting with an excellent flowering in a year when the drought was at its worst. The same can be said of two other sites south of Nowra. In the 60 plant colony, which was burned three years ago, not one plant was seen to flower in 2008 and all of these plants have been recorded by DECC and the colony is marked with stakes forming a triangle shape. However 50 m up the slope from this group in low grass, another 60 or so plants were seen and these are plants which have not been recorded in previous years. As 2008 was a year of slightly better than average rainfall I am at a loss to explain how no plants from the known colony provided flowers and yet a good display was available 50 m away on the obvious fringe of the burned area. This site is subject to a proposed development and I am unable to say whether the fire was accidental or otherwise. One thought which came to mind is to ask if the is species is like many other Australian flowers which will flower in bad times as a last effort to survive.

Steve has returned to Sydney and will check the authenticity of the GPS records as we both feel the last two sites are to say the least, quite doubtful. However they must be checked and the habitat recorded for the process to be completed. This will almost certainly be the end of the field work and following this, data from all sites visited, whether *C. hunteriana* was *in situ* or not, will be collated and assessed to determine if indeed *C. hunteriana* has a preferred habitat. This is a job I do not envy as with what I have seen over the past decade regarding *C. hunteriana* sites I feel this is an impossible task, as the variation of habitat ranges from wet sclerophyll, Leptospermum/Melaleuca scrub to semi-open woodland sprinkled with *Banksia serrata* and the dry edges of a fire trail including a run-off drain from that same fire trail. The stated aim of the work is to find this preferred habitat and in the future, save survey time, effort and money by being able to survey when the orchid is not in flower. If this can be done governments and developers will save time and money and plants will be saved from possible destruction, partly due to the indifferent flowering habit of the species.

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Cryptostylis hunteriana habitat at Vincentia.This site has regular flowering each year.

Another area near Vincentia where *Cryptostylis hunteriana* flowers regularly.

A run off drian from Yarran Rd which is another regular flowering site.

Steven Chamerlain of Bangalay Botanical Surveys, at the Wirrilliko Rd site.

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Three new species of *Oligochaetochilus* (Orchidaceae) from South Australia.

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Abstract

Three rare or threatened taxa from South Australia, *Oligochaetochilus exallus, O. ferrugineus* and *O. lepidus* are described as new.

Key Words

Orchidaceae, *Oligochaetochilus exallus*, *O. ferrugineus, O. lepidus* new species, endangered, Australian flora, South Australia.

Introduction

This is the second paper dealing with species of *Oligochaetochilus* from South Australia (Jones 2007). The genus is well developed in South Australia where it has radiated into a wide range of semi-arid habitats with a number of poorly collected and highly specialized species awaiting formal recognition (see for example Bates 2008). Three species from South Australia, one a threatened species with a restricted distribution, the others with a reduced or poorly known distribution, are described here as new.

Materials and Methods

The description of the new taxa was made from fresh and dried specimens. Dried specimens of *Oligochaetochilus* species were examined from the following herbaria: AD, BRI, CANB, HO, MEL, NSW and PERTH. Unless otherwise indicated, all types of related *Oligochaetochilus* taxa (or photographs thereof) have been examined.

Taxonomy

1. *Oligochaetochilus exallus* D.L.Jones, *sp. nov.*; affinis *O. boormanii* (Rupp) Szlach., sed floribus minoribus, pallidis castaneis; sepalis lateralibus angustioribus, sparse pubescentibus; labello multo oblongo ad oblongo, ad apicem obtusum, differt.

Type: South Australia. Southern Lofty Region: Belvidere (Wombat Plains), property of Jenny Blackett, 9 Sept. 1999, *D.L.Jones 16799, M.Garratt & J.Eckert* (holo CANB 606694; iso AD, MEL).

Description: *Tubers* not seen. *Leaves* sessile, 5-8 in a radical rosette, loosely imbricate, green or withered at anthesis; lamina oblong, oblong-ovate to ovate, 7-25 mm long, 4-10 mm wide, dull green, obscurely veined; margins entire; apex acute. *Scape* 5-15 cm tall, 1-1.5 mm diam., 2-6-flowered. *Sterile bracts* 2-4, closely sheathing, oblong-ovate, 5-13 mm long, 4-6 mm wide, acuminate, usually chartaceous at anthesis. *Floral bracts* closely sheathing, ovate-lanceolate, 5-14 mm long, 3-5 mm wide, acuminate. *Pedicels* 3-6 mm long, slender, straight or slightly curved. *Ovary* narrowly obovoid, 3-5 mm long, c. 1 mm wide, green to brownish. *Flowers* porrect to semi-nodding; galea translucent white with brown bands and suffusions; lateral sepals mostly light brown to dark brown with chequered patterns; petals transparent with a proximal brown area extending along the margin and a vein. *Galea* gibbous at the base, curved throughout, suddenly decurved to the apex, glabrous or with a few short acicular siliceous cells; petal flanges poorly developed, not closing off the base of the galea; petal margins flared. *Dorsal sepal* 15-19 mm long including the apical point, cucullate, porrect, decurved in the distal quarter; apical point porrect to upcurved, filiform, 3-5 mm long. *Lateral sepals* deflexed, not usually reflexed back towards the ovary; conjoined part wider than the galea, shallowly concave, broadly ovate when flattened, 4-7 mm long, 9-12 mm wide; margins incurved, sparsely hirsute; sinus relatively broad; free points filiform, 9-15 mm long, divergent, projected forwards or curved outwards, 8-14 mm apart at the tips. *Petals* asymmetrical, broadly ovate-lanceolate, 9-12 mm long, 4-5.5 mm wide, slightly falcate; dorsal margin thickened, brownish, sparsely hairy; anterior margin broadly curved, glabrous; proximal flange vestigial. *Labellum* highly irritable, attached by a green ligulate basal claw c. 1.2 mm long, c. 1 mm wide. *Lamina* broadly oblong to oblong, 4-5 mm long, 1.5-2 mm wide, shallowly constricted near the junction with the basal lobe, brown; basal lobe about as wide as the lamina, glabrous or with a few short setae; adaxial surface hirsute, with a broad central groove; abaxial surface with a deep, narrow central channel extending from the basal lobe nearly to the apex; apex obtuse, sometimes almost emarginate. *Labellum marginal setae* spreading, 6-10, the longest to c. 2.5 mm long, the distal margins with numerous short, crowded, sericeous trichomes. *Column* porrect from the end of the ovary, recurved, 9-12 mm long, c. 2.5 mm wide. *Column wings* more or less rectangular, c. 3 mm long, c. 2 mm wide; upper lobe vestigial; basal lobe ovate, ciliate; barrier trichomes irregularly moniliform, exserted. *Anther* c. 1.3 mm long, obtuse. *Pollinia* linear-oblong, c. 1.3 mm long, yellow, mealy. *Stigma* narrowly obovate, c. 4.5 mm long, c. 2 mm wide, the upper margins irregular. *Capsules* not seen. **Fig. 1.**

Distribution and ecology: Occurs on the plains in the Southern Lofty Region of South Australia and possibly extending into adjacent regions but exact distribution uncertain due to confusion with *O. boormanii* which is quite widespread in South Australia. It grows in woodland dominated by *Callitris murrayensis* with an open grassy understorey in well-drained white sand over limestone. Alt. 50-300 m. Flowering: Late August to October.

Recognition: Characterised by light brown to dark brown porrect to semi-nodding flowers; apical point on dorsal sepal 3-5 mm long; lateral sepals broadly ovate when flattened, 8-10 mm wide, sparsely hirsute, with a wide sinus gap and divergent filiform free points 9-15 mm long; broadly oblong to oblong labellum with an obtuse apex, broad basal lobe, the distal margins covered with short sericeous trichomes and, 8-10 marginal setae to 2.5 mm long.

Similar species: This species is generally similar to *O. boormanii* (Rupp) Szlach. in many of its floral features but the latter has larger, dark brown to almost blackish-brown flowers with very broadly ovate (12-15 mm across), densely hirsute lateral sepals that impart the distinct appearance of "baggy britches". The most obvious difference between the two species lies in the labellum. That of the new species is broadly oblong to oblong whereas *O. boormanii* has an overall narrow labellum that tapers from just above the base to the apex.

Notes: This species has been known as *Oligochaetochilus* aff. *boormanii* 'Coastal' and *Pterostylis* 'Belvidere' (Bates 2008). It belongs in section *Boormania* D.L.Jones & M.A.Clem. (Jones & Clements 2002).

Conservation status: Poorly known and in need of surveys to determine its distribution and security of tenure. Bates (2008) suggests 3V.

Etymology: The Latin *exallos*, different, changed, in reference to the distinct labellum shape in comparison with *O. boormanii* which the new species resembles in other general features.

Other specimens: SOUTH AUSTRALIA: Belvidere Scrub, 7 Sept. 1999, *D.E.Murfet 3603, H.J.Eckert & R.Taplin* (AD, CANB); E of Eckert Rd, Belvidere, 8 Sept. 2000, *D.E.Murfet 3776 & R.Taplin* (AD, CANB).

2. *Oligochaetochilus ferrugineus* D.L.Jones, ***sp. nov.***; affinis *O. squamato* (R.Br.) Szlach., sed foliis rosulis multo majoribus, obovatis, valde venis; sepalo dorsali puncto apicali longiore; sepalis lateralibus angustioribus punctis liberis longiore; petalis basi attenuate et apice longi-acuminato; labello anguste oblongo, ciliis marginalibus crebrioribus, differt.

Type: South Australia. Padthaway Conservation Park, 25 Oct. 2001, *D.L.Jones 18027 & B.E.Jones* (holo CANB 632419; iso AD, MEL).

Description: *Tubers* oblate, c. 10-18 mm diam. *Leaves* sessile, 6-10 in a radical rosette, loosely imbricate, often withered at anthesis; lamina obovate-spathulate, 15-60 mm long, 6-20 mm wide, dull green, prominently veined; margins entire; apex obtuse to subacute. *Scape* 15-40 cm tall, 1-2 mm diam., 2-10-flowered. *Sterile bracts* 3-5, closely sheathing, oblong-ovate, 8-18 mm long, 4-6 mm wide, subacute, usually chartaceous at anthesis. *Floral bracts* closely sheathing, ovate-lanceolate, 8-16 mm long, 3-5 mm wide, subacute. *Pedicels* 6-20 mm long, slender, straight or slightly curved. *Ovary* narrowly obovoid, 5-7 mm long, c. 2 mm wide, green to brownish. *Flowers* porrect; galea translucent white with dark olive green bands and tonings; lateral sepals uniformly red brown, shiny; petals translucent white with brown lines and tonings. *Galea* shallowly gibbous at the base, curved medially, suddenly decurved to the apex, glabrous; petal flanges well developed, touching and closing off the base of the galea; anterior petal margins flared. *Dorsal sepal* 10-14 mm long including the apical point, cucullate, porrect, decurved in the distal quarter; apical point porrect to upcurved, 1-2 mm long, acuminate. *Lateral sepals* deflexed, reflexed back towards the ovary; conjoined part similar width to the galea, shallowly concave to nearly flat, ovate-elliptic when flattened, 7-10 mm long, 6-8 mm wide; margins strongly incurved, glabrous; sinus very narrow; free points shortly attenuate, 1-2 mm long, nearly parallel or slightly divergent, curved forwards, 2-4 mm apart at the tips. *Petals* asymmetrically oblanceolate, 8-11 mm long, 3-4 mm wide, straight to slightly falcate; dorsal margin thickened, dark brown, sparsely ciliate; anterior margin glabrous; proximal flange well developed, swollen. *Labellum* highly irritable, attached by a green ligulate basal claw c. 1.6 mm long, c. 1 mm wide. *Lamina* oblong to oblong-obovate, 3.8-4.2 mm long, 1.8-2 mm wide, shallowly constricted near the junction with the basal lobe, dark red brown; basal lobe not much wider than the lamina but thicker, with numerous short marginal setae; adaxial surface mostly glabrous, with a shallow central groove; abaxial surface with a narrow central channel extending from the basal lobe to the apex, flanked by 2 ridges; apex broadly obtuse. *Labellum marginal setae* spreading, few to many, mostly very short, the longest to c. 1.5 mm long. *Column* porrect from the end of the ovary, recurved, 9-11 mm long, c. 2.5 mm wide. *Column wings* more or less rectangular, c. 2 mm long, c. 1.3 mm wide; upper lobe vestigial; basal lobe ovate, ciliate; barrier trichomes irregularly moniliform, exserted. *Anther* c. 1.3 mm long, obtuse. *Pollinia* linear-oblong, c. 1.3 mm long, yellow, mealy. *Stigma* narrowly obovate, c. 5 mm long, c. 2 mm wide, the upper margins irregular. *Capsules* not seen. **Fig. 2.**

Distribution and ecology: Occurs in the Southern Lofty and South-East districts of South Australia and adjacent areas of south-western Victoria. Also recorded disjunctly from near Cockatoo Valley on the southern edge of the Barossa Valley (Bates 2008). It grows in open forest and woodland with a shrubby or heathy understorey in well-drained sandy loam. Alt. 50-150 m. Flowering: Late September to November.

Recognition: Characterised by glabrous, translucent white, dark green and red brown flowers; dorsal sepal with a short apical point; lateral sepals very shallowly concave to nearly flat, with strongly incurved margins; and, oblong to oblong-obovate labellum with few-many marginal setae to 1.5 mm long.

Similar species: Apparently most similar to *O. squamatus* (R.Br.) Szlach. but with much larger, obovate, strongly veined rosette leaves, longer points on the sepals, narrower lateral sepals with the conjoined part nearly flat, unusual petals with an attenuate base and long-acuminate apex, and an oblong to oblong-obovate labellum with more numerous marginal cilia.

Notes: This species has been known as *Oligochaetochilus* sp. 'Sandplain' (D.N.Kraehenbuehl 5670) (Bates 2008) with the vernacular of Bangham Rustyhood. It belongs in section *Oligochaetochilus* (Jones & Clements 2002).

Conservation status: Once widespread and common (R.Bates pers. comm.) but now greatly restricted and threatened because of habitat alienation; conserved in at least 3 conservation reserves; suggest 3EC by the criteria of Briggs & Leigh (1996).

Other specimens: SOUTH AUSTRALIA: near Desert Camp, 10 & 19 Oct. 1966, *M.Beek* (CANB); Mt Monster Conservation Park, 7 Oct. 1995, *P.Branwhite (DLJ 14531)* (CANB); Mt Monster, 4 Oct. 1969, *D.Foster* (CANB); Culburra, 4 Nov. 2003, *C.&M.Houston 29* (CANB); Bangham, 4 Nov. 2003, *C.&M.Houston 30* (CANB); Bangham Conservation Park (bud), 6 July 1999, *D.L.Jones 16443* (CANB); *ibid,* 25 Oct. 2001, *D.L.Jones 18032* & *B.E.Jones* (CANB). VICTORIA: Portland, Oct. 1936, *Mellblom* (NSW); Tallageira State Forest, 18 Aug. 2001, *D.E.Murfet 3892* & *K.Alcock* (CANB).

3. *Oligochaetochilus lepidus* D.L.Jones, ***sp. nov.***; affinis *O. boormanii* (Rupp) Szlach., sed floribus minoribus, viridis et pallidis castaneis; sepalo dorsali puncto filformi breviore; sepalis lateralibus angustioribus sparse hirsutis; labello profunde canaliculato, setis marginalibus paucioribus, differt.

Type: South Australia. Near Halbury [precise locality withheld for conservation purposes], 21 Sept. 1998, *D.L.Jones 15748 & M.Garratt* (holo CANB 664199; iso AD, BRI, MEL, NSW).

Description: *Tubers* not seen. *Leaves* sessile, 5-8 in a radical rosette, loosely imbricate, usually withered at anthesis; lamina oblong-ovate, 10-30 mm long, 6-12 mm wide, dull green, obscurely veined; margins entire; apex obtuse to subacute. *Scape* 7-20 cm tall, 1-1.5 mm diam., 2-10-flowered. *Sterile bracts* 2-4, closely sheathing, oblong-ovate, 8-15 mm long, 4-6 mm wide, subacute, usually chartaceous at anthesis. *Floral bracts* closely sheathing, ovate-lanceolate, 8-16 mm long, 3-5 mm wide, acute. *Pedicels* 5-15 mm long, slender, straight or slightly curved. *Ovary* narrowly obovoid, 3-7 mm long, c. 1.5 mm wide, green to brownish. *Flowers* porrect; galea translucent with green or brown bands and suffusions; lateral sepals mostly green to light red brown with 2 paler bands and chequered patterns; petals transparent with a proximal brown area extending along a vein. *Galea* gibbous at the base, curved throughout, suddenly decurved to the apex, glabrous or with a few short acicular siliceous cells; petal flanges poorly developed, not closing off the base of the galea; petal margins not flared. *Dorsal sepal* 13-17 mm long including the apical point, cucullate, porrect, decurved in the distal quarter; apical point porrect to upcurved, filiform, 4-6 mm long. *Lateral sepals* deflexed, not usually reflexed back towards the ovary; conjoined part wider than the galea, shallowly to moderately deeply concave, ovate when flattened, 8-12 mm long, 8-10 mm wide; margins incurved, sparsely hirsute; sinus relatively broad; free points filiform, 9-12 mm long, divergent, projected forwards or curved outwards, 8-14 mm apart at the tips. *Petals* asymmetrical, ovate-lanceolate, 10-12 mm long, 3-4.5 mm wide, slightly falcate; dorsal margin thickened, brownish, glabrous; anterior margin glabrous; proximal flange vestigial. *Labellum* highly irritable, attached by a green ligulate basal claw c. 1 mm long, c. 1 mm wide. *Lamina* oblong-tapered, 4-5 mm long, 1.8-2 mm wide, shallowly constricted near the junction with the basal lobe, dark red brown; basal lobe narrower than the lamina but thicker, glabrous or with a few short setae; adaxial surface glabrous, with a prominent central groove; abaxial surface with a deep, narrow central channel extending from the basal lobe nearly to the apex; apex obtuse, sometimes narrowed just before the apex. *Labellum marginal setae* projected forwards, 8-10, the longest to c. 3 mm long, the distal margins with numerous short, crowded, sericeous trichomes. *Column* porrect from the end of the ovary, recurved, 9-11 mm long, c. 2.5 mm wide. *Column wings* more or less rectangular, c. 3 mm long, c. 2 mm wide; upper lobe vestigial; basal lobe ovate, ciliate; barrier trichomes irregularly moniliform, exserted. *Anther* c. 1.3 mm long, obtuse. *Pollinia* linear-oblong, c. 1.3 mm long, yellow, mealy. *Stigma* narrowly obovate, c. 4.5 mm long, c. 2 mm wide, the upper margins irregular. *Capsules* not seen.

Distribution and ecology: Once occuring on the plains north of Adelaide in the Southern Lofty and Northern Lofty districts of south-eastern South Australia, extending north to about Snowtown (Bates 2008). It grows in *Callitris* woodland and mallee vegetation in well-drained clay loam, often over limestone. Alt. 50-300 m. Flowering: Late July to October.

Recognition: Characterised by green and light reddish brown flowers; apical point on dorsal sepal 4-6 mm long; lateral sepals ovate when flattened, 8-10 mm wide, sparsely hirsute, with a wide sinus gap and divergent filiform free points 9-12 mm long; oblong-tapered labellum with a narrow basal lobe, deep narrow central groove, the distal margins covered with short sericeous trichomes and, 8-10 marginal setae to 3 mm long.

Similar species: Most similar to *O. boormanii* (Rupp) Szlach. which has larger, dark brown to almost blackish-brown flowers, a longer point on the dorsal sepal (6-9 mm), much broader (12-15 mm wide), densely hirsute lateral sepals and a more shallowly grooved labellum with more numerous marginal setae.

Notes: This species has been known as *Oligochaetochilus* sp. 'Halbury' and *Pterostylis* 'Halbury' (Bates 2008) with the vernacular of Halbury Rustyhood. It belongs in section *Boormania* D.L.Jones & M.A.Clem. (Jones & Clements 2002).

Conservation status: Once widespread and common (R.Bates pers. comm.) but now greatly reduced by clearing and restricted to a single population which is being severely impacted by weeds; suggest 2EC by the criteria of Briggs & Leigh (1996).

Etymology: The Latin *lepidus*, elegant, neat, fine, in reference to the neat habit of the flowers in comparison with those of *O. boormanii*.

Acknowledgements

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References

Bates, R., *et al.* (2008). *South Australian Native Orchids – Electronic Version*. Native Orchid Society of South Australia.

Briggs, J.D. & Leigh (1996). *Rare or Threatened Australian Plants*, Revised Edition, CSIRO and Australian Nature Conservation Agency.

Jones, D. L. (2007). Two new species of *Oligochaetochilus* (Orchidaceae) from South Australia. *Orchadian* 15(9): 394-399.

Jones, D. L. & Clements, M.A. (2002). A new classification of *Pterostylis* R. Br. (Orchidaceae). *Austral. Orch. Res.* 4: 64-89.

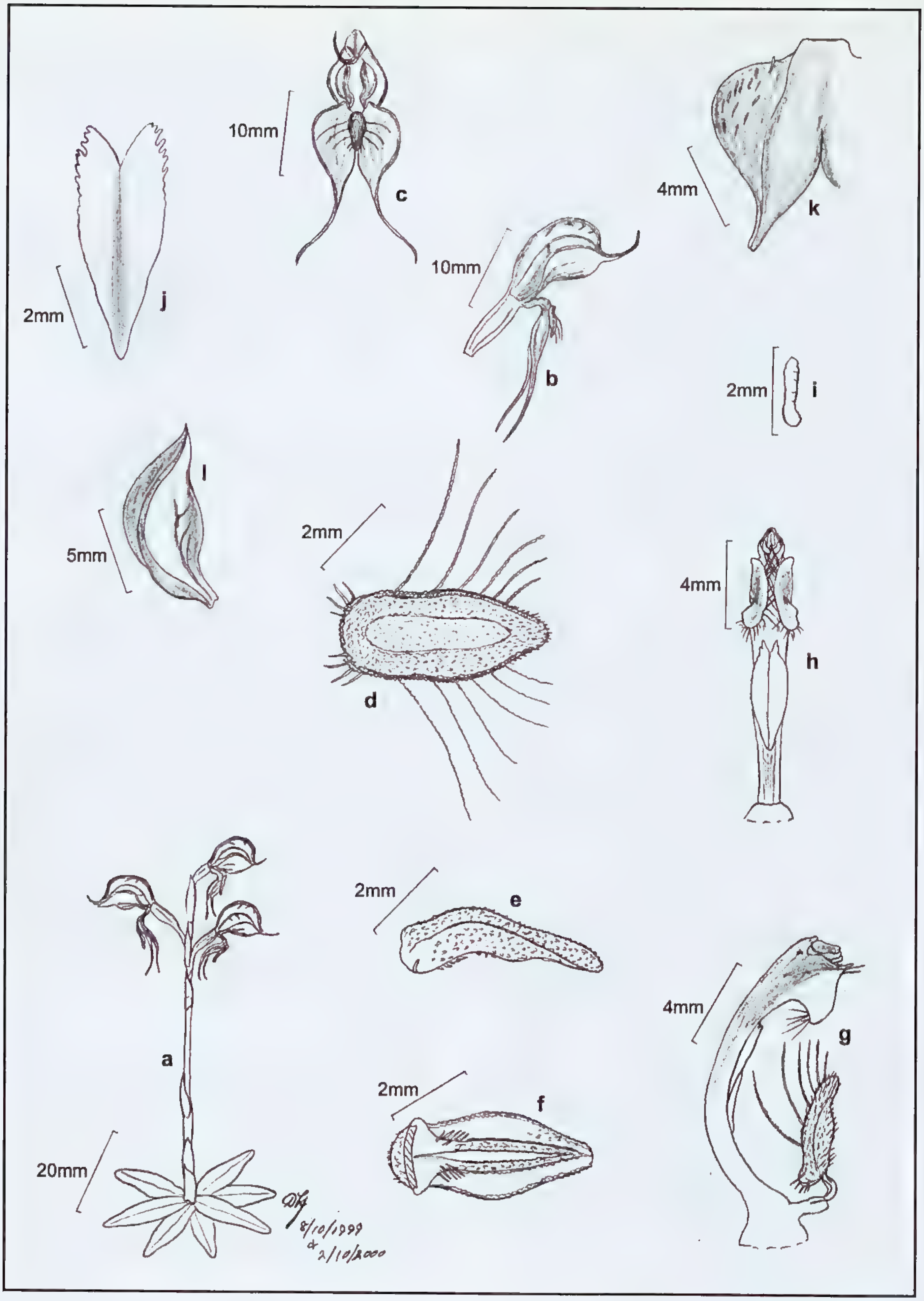


Fig. 1. *Oligochaetochilus exallus*, Belvidere (Wombat Plains), *D.L.Jones 16799, M.Garratt* & J.Eckert (drawn in part from the type collection). a. flowering plant; b. flower from side; c. flower from front; d. labellum from above, flattened; e. labellum from side; f. labellum from below; g. column and labellum from side; h. column from front; i. pollinium; j. stigma; k. part of synsepalum, dorsal view; l. petal.

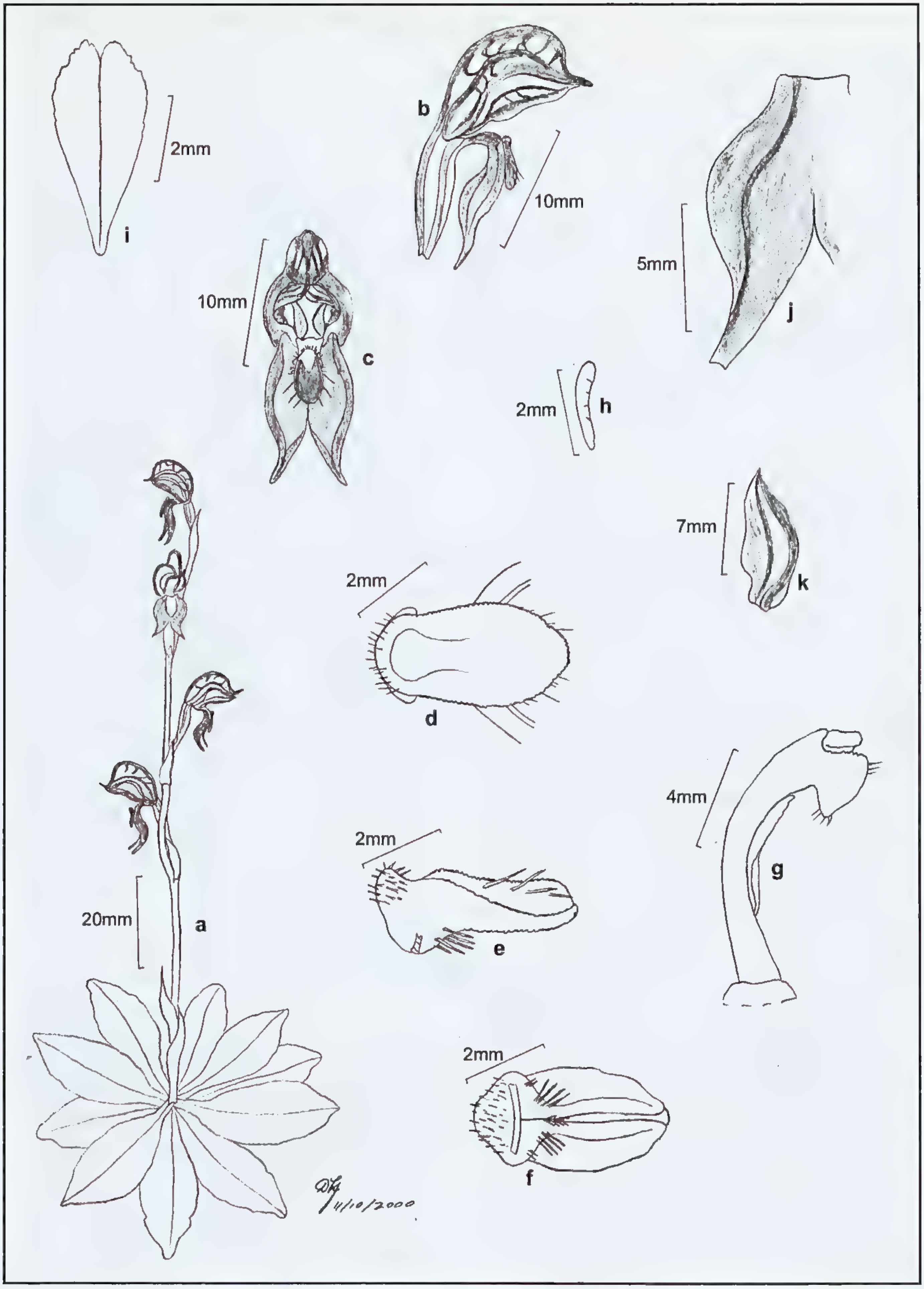
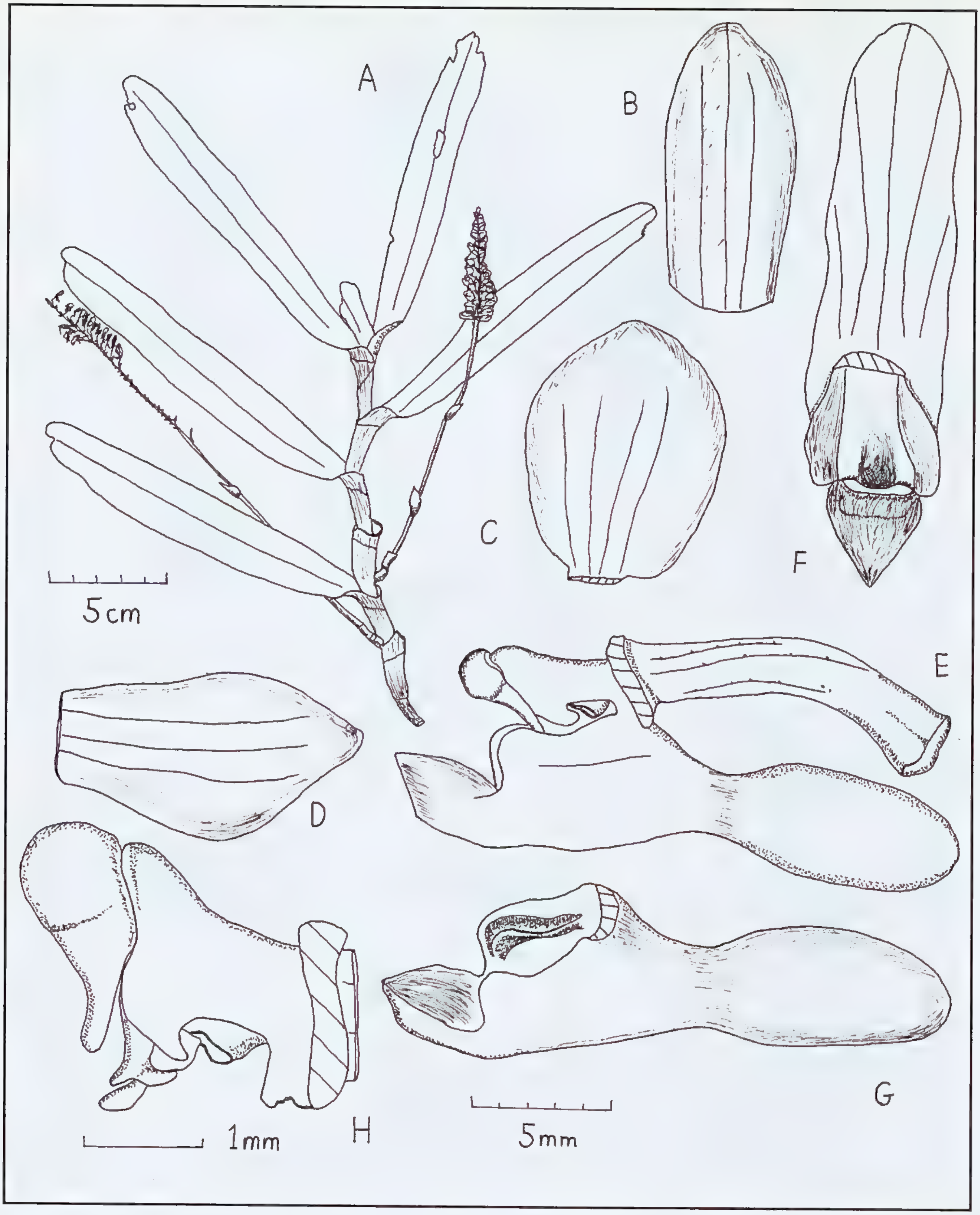


Fig. 2. *Oligochaetochilus ferrugineus*, Bangham Conservation Park, *D.L.Jones 16443*. a. flowering plant; b. flower from side; c. flower from front; d. labellum from above, flattened; e. labellum from side; f. labellum from below; g. column from side; h. pollinium; i. stigma; j. part of synsepalum, dorsal view; k. petal.



Robiquetia millarae - A. plant; B. dorsal sepal; C. petal; D. lateral sepal; E. flower minus tepals; F. labellum and spur from above; G. labellum and spur from side; H. column. A,B-G and H to respective scales. A drawn from isotype (K), rest from holotype (AMES).

A New *Robiquetia* from Bougainville.

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ABSTRACT: *Robiquetia millarae* is proposed as a new species from Bougainville. Its affinities are discussed and the species is described and illustrated.

Robiquetia Gaud. is a vandaceous genus of about 40 species distributed from Sri Lanka to Samoa and Tonga. Many of the species make attractive horticultural subjects due to the densely flowered racemes of flowers in shades of white, yellow, pink or purple. The majority of species occur in the Malesian floristic zone (i.e. the "Malay Archipelago") with a few small areas of diversity in the Philippines, Borneo, Sulawesi and New Guinea.

Lewis & Cribb (1991) recorded three species (one endemic) as native to the Solomon Islands and Bougainville. However it was later found (Ormerod 1995) that specimens referred to the New Guinean species *R. mooreana* (Rolfe) J.J.Sm. [= *R. ascendens* Gaud.] mostly belonged to variable and common endemic *R. woodfordii* (Rolfe) Garay. Thus until recently it seemed there were only two species of *Robiquetia* in the Solomons and Bougainville, namely *R. gracilistipes* (Schltr.) J.J.Sm. and *R. woodfordii.* A review of material of *R. woodfordii* at Harvard and Kew however leads me to the view that one more entity should be recognised as occurring on Bougainville due to its distinctive floral morphology, discussed below.

Robiquetia millarae Ormerod, *sp. nov.*
TYPE: Papua New Guinea – Bougainville, Kieta Subdistrict, Arawa Plantation, cultivated on *Leucaena leucocephala*, 15 m, 6 December 1969, *A.N. Millar NGF 38415* (Holotype: AMES!; Isotypes: BO, BRI!, CANB, K!, L, LAE!, NSW!).
Affinis R. brassii Ormerod sed floribus aureis, epichilo viridis (non rubro vel sordide purpureis), lobulis hypochilo truncatis (non late rotundatis) et carina hypochilo in incrassatione obovoideis (non ecallosis) terminatis differt.

Epiphytic herb. Roots terete, elongate, emerging from lower internodes below leaves, sometimes growing back along stem, to 2 mm thick. Stems subterete, modestly elongate, probably semipendent, laxly 5-7-leaved, part preserved 15-16 cm long, 0.4 cm thick; internodes ca. 2 cm long. Leaves ligulate to ligulate-oblanceolate, apex inequally obtusely bilobed, coriaceous, dark green, 14.8-18.5 cm long, 1.3-3.6 cm wide; leaf sheaths tubular, obliquely truncate opposite leaf axil, striate in dry state, 2.0-2.5 cm long, 0.5-1.0 cm wide. Inflorescence 16.8-20.0 cm long; peduncle terete, 10.3-12.0 cm long; peduncular sheaths tubular (7-11 mm long) to ovate-lanceolate (6mm long, 4 mm wide); rachis densely many-flowered, 6.5-9.0 cm long; floral bracts lanceolate, acute, to 5 mm long. Pedicellate ovary subterete, laxly furfuraceous, 5-6 mm long. Flowers with sepals laxly furfuraceous externally, yellow, sepals with darker edges, lip with yellow sidelobes, green midlobe and gold spur. Dorsal sepal oblong, obtuse, concave, 3 veined, 5.0-5.5 mm long, 2.5 mm wide. Lateral sepals obliquely elliptic, obtuse, concave, 3 veined, 5.5 m long, 2.5 mm wide. Petals broadly obovate-elliptic, obtuse, 3 veined, minutely laxly furfuraceous externally in a band around the upper and lower margins, 4.5 mm long, 2.8-3.5 mm wide. Labellum trilobed, spurred; spur thickly clavate, obtuse, 4.5-6.5 mm long, to 1.95 mm wide laterally; hypochile 2.3-2.5 mm long, sides 2 mm wide, sidelobes rectangular, truncate but apical corners rounded, inside upper margin each side with a callose ledge, medially with a low, broad, rounded keel that terminates at the hypochile apex in a broad obovoid callosity; epichile deltoid (viewed from above), acute, fleshy, solid, 1.5-2.0 mm long, 0.95-1.15 mm wide laterally. Column hamate, 2.1 mm long.

Distribution: Papua New Guinea (Bougainville).

Etymology: The specific epithet honours Andree Norma Millar (1916-1997) collector of the type. She popularised New Guinea orchids through her various writings and brought into culture many of the more horticulturally desirable species, not to mention her sizeable contribution of specimens to the Lae herbarium.

Notes: *Robiquetia millarae* appears to be most similar to the West New Guinean *R. brassii* Ormerod but it differs from that species in having yellow flowers with a green midlobe, a labellum hypochile with a rounded central keel that terminates in an obovoid callosity and rectangular, truncate sidelobes. *Robiquetia brassii* has flowers that are red to dirty purple, the labellum hypochile has a sharp central keel that doesn't terminate in a callosity and the broadly elliptic sidelobes are broadly rounded.

Robiquetia woodfordii differs from the new species in lacking a median keel on the hypochile and the epichile is dominated by an exposed central callus (a feature hitherto overlooked due to the assumption that its epichile was thought to be a single fleshy lobe). The epichile of *R. millarae* lacks the large callus of *R. woodfordii.*

Acknowledgements.

I wish to thank herbarium and library staff at AMES, BRI, K, LAE and NSW for their help and hospitality during my visits.

Literature Cited.

Lewis, B.A. & Cribb, P. 1991. Orchids of the Solomon Islands and Bougainville. RBG Kew.

Ormerod, P. 1995. Complementary Studies of Solomon Archipelago Orchids. Austral. Orch. Rev. 60, 2:35-39.

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Mycorrhizal fungi and epiphytes – In and Ex – Situ

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The above topic had interested me for a while so during the hot weather in January last I sought refuge in air-conditioned surroundings to do a small amount of research. Below is the result of where I got to which may be of interest to readers. I'm simply a hobbyist grower and completely unqualified in botanical science. It might however stimulate some thought and discussion.

Introduction

Most orchid growers are familiar with the mutualistic interactions between particular fungi and the seed and tubers of terrestrial orchids. It is less appreciated that the same associations exist for many epiphytic orchids – in fact all epiphytic orchids at the seed germination stage. In this article I will just consider epiphytic orchids. I was particularly interested to consider this subject from the view of the establishment and growth of our native epiphytes in the bush (in-situ) and to contrast that with the establishment and growth of the same orchids horticulturally (ex-situ). The latter is obviously of interest to the hobbyist grower. Are there any implications for the way we look after and nurture our plants? Can we look to substrate specificities seen in the bush and use that knowledge to improve the culture of our plants? Are there fungal associations which explain why some orchids, particularly twig epiphytes, do not survive without limit ex-situ? I will try to address and/or speculate on the answers to these questions.

Firstly, I will review the orchid-fungal relationship and follow that with what is known and being looked into concerning in-situ plants. I will then discuss ex-situ considerations.

Conclusions

For epiphytic orchids in particular, this is an area of research which is in its early stages. Much remains to be done; a task which will take time given that these projects understandably do not get the highest priority for funding. Strong substrate preferences are shown by a substantial number of our epiphytes. Obviously trees that shed bark or are in the wrong location so far as humidity, light and water availability are concerned will not be preferred. However, many trees/rocks are available which are still not preferred and the reasons for this are still not understood fully. The balance of opinion, though, appears to be that the presence of suitable fungi to support germination (subject to the factors mentioned before) is the overriding factor driving the substrate specificity (Dearnaley, e-mail Jan 2009). As such the preservation of preferred substrate plants in the bush must form an integral part of any conservation program.

There appear to be no horticultural implications concerning the above. Our epiphytes do well in all sorts of media and on all sorts of mounts because we satisfy our plants' needs for the right light, nutrients, pest control, temperature, etc. This is in contrast to in-situ plants which must make the best use of nature to provide that support. Some twig epiphytes may represent a special case and this point is expanded upon below.

The fact that *Dendrobium speciosum* cannot be successfully propagated ex-situ through meristem culture appears to be because we do not understand the nutritional needs of the speciosum protocorms from meristem culture. An approach of using mycorrhizal fungi together with added nutrients is unlikely to be the answer, however.

Review

The seeds of all orchids are small and have insufficient resources for self germination and establishment of the young seedlings (eg Jones, 2006 and Chah website). Although very large numbers of seeds are produced and ejected by one seed pod – the small size and number combined with air movement guarantee a wide dispersal – the chances for survival are low. In order to survive, the window being no longer than 4-5 months (Jones, 2006), the seed must encounter an appropriate species of fungus which will attach itself to the seed and supply it with the nutrients the seed requires in order to start or complete germination and develop. This appears to be a chance meeting (Arditti, 1992) and moisture needs to be present. The relationship between the particular fungus and the orchid is referred to as a mycorrhiza while the fungus which enters into this relationship is referred to as a mycorrhizal fungus. The process which then occurs is referred to as symbiosis or symbiotic germination (eg Hadley, 1982). Many question the use of the term symbiosis as they argue that the gains/benefits to the fungus are unclear (eg Light, 2003) and some prefer the term mutualism (eg Wood, 2006). However, others argue that there are benefits for both sides (Arditti, 1992 and Dearnaley, 2007). I will stay with the term symbiosis and refer to each partner using the accepted term 'symbiont'. This point will be expanded upon below.

The important point here is that the partnership between the mycorrhizal fungus and seed is an essential prerequisite for a successful germination for both in-situ epiphytic and terrestrial orchids. There is a comparatively large literature, experience and knowledge in this area for terrestrial orchids. There is much less so in the case of epiphytic orchids; the focus of this article.

The Mycorrhizal Fungus - Orchid Seed Relationship

An orchid mycorrhizal fungus has threads (hyphae) which will form a symbiotic link with an orchid seed in the presence of moisture. The germinating seed swells and forms a protocorm which is capable of limited photosynthesis. Initial infection/colonisation of the protocorm occurs through epidermal hairs or rhizoids. Meristems are formed at each end of the protocorm and give rise to leaves and rootlets respectively (Dearnaley, 2009 and eg Jones, 2006). Fungal hyphae enter the ends of the small rootlets forming coiled structures (called pelotons) within the outer layer of the orchid rootlet cells (eg Light, 2003). The orchid protocorm/tiny seedling then digests these to derive the nutrients it needs to complete germination and become a true seedling. Once the seedling develops (and can fully photosynthesise) reliance on the fungus decreases. In the case of epiphytic orchids some controversy surrounds whether the mycorrhizal fungi have an ongoing role in the development and growth of the photosynthetic or self-sustaining (autotrophic) plant. Some believe yes depending on the genus/species (eg Dearnaley,2007 and Suarez et al, 2008), the argument being that while photosynthesis will trap the plants' requirement for carbon, the mycorrhizal fungus will assist the plant in obtaining all its requirements for inorganic nutrients (Dearnaley, 2009). However, others believe not, as the mycorrhizal fungi count is too low to be of much use to the adult plant (eg Benzing, e-mail Jan 2009).

In contrast, in the case of deciduous terrestrial orchids, symbiosis is clearly a long term requirement (eg Rasmussen, 1995 and Jones, 2006). For colony forming species such as *Pterostylis nutans* the young tubers will only satisfactorily develop from parent tubers if the mycorrhizal fungi are present. In the case of non-colony forming species such as *Caladenia tentaculata* the mycorrhizal fungi are essential for the germination of the dispersed seed.

Orchid – Mycorrhizal Fungus (Symbiosis)

The meeting of orchid seed with potential mycorrhizal fungi will lead to the establishment of a successful and stable symbiosis only if the conditions are right, however. If not, no infection of the orchid seed will occur and germination will not proceed. Alternatively, some symbiosis may occur, but this is disturbed after a period resulting in the fungus cannabilising (more correctly parasitising) the orchid or vice versa (eg Arditti, 1992). However, if the conditions are right and a stable symbiotic relationship is established then it appears that the following are the benefits for both symbionts (from a species survival viewpoint):

The orchid: The germinating seed receives sustenance to ensure germination can be completed and this sustenance is ongoing which ensures that the protocorm and autotrophic (self sustaining) seedling can develop.

The mycorrhizal fungus: Many say (eg Wood, 2006; Light, 2003) that the benefit here is unclear. However, some evidence was published (Arditti, 1992) that the mycorrhizal fungus obtains some nutrients from the orchid and that protection is afforded to it by an association with the roots of the orchid. More recently, Cameron et al (work cited by Dearnaley, 2007) have demonstrated in at least one case carbon transfer from the orchid to the fungus had occurred suggesting true symbiosis. Based on this and other evidence, Dearnaley considers the relationship as being a true symbiosis (Dearnaley, 2007). Furthermore, carbon transfer from the mycorrhizal fungi to and from the substrate has also been seen (discussed by Dearnaley, 2007 for example).

Mycorrhizal Fungi and Epiphytes – Substrate Specificity

Many epiphytes in situ have clear substrate preferences. Obviously, where the adult plants are found is where the seeds have germinated and so these substrates have been particularly favoured in this respect. Examples include:

Dendrobium affine (syn *Dendrobium dicuphum*) on Tamarind Trees (*Tamarindus indica*) on Komodo Island, Indonesia (personal observation, July 2006).

Dendrobium falcorostrum on Antarctic Beech Trees (*Nothofagus moorei*) (eg Upton, 1989).

Dendrobium aemulum – three main vegetative forms (eg Upton, 1989):
- narrow pseudobulbous form with dull and pale leaves on ironbark *Eucalyptus* trees (southern New South Wales to southern Queensland).
- another narrow pseudobulbous form but with dark green, shiny leaves on Brush Box trees (*Lophostemon confertus*) (northern New South Wales to southern Queensland).
- A less common form with very thin pseudobulbs on Cypress Pines (*Callistris* sp) in Northern Queensland.

Dendrobium (*Dockrillia*) *teretifolium* – in southern New South Wales it grows almost exclusively on Swamp Oak (*Casuarina glauca*) (Jones, 2006).

Sarcochilus hillii, Sarc. parviflorus and *Plectorrhiza tridentata* have reportedly strongly favoured *Backhousia myrtifolia* in four specific sites in 'south-eastern' Australia (Gowland et al, 2007) [noting that such specificity has not been seen for these species in South East Queensland – Dearnaley, 2009].

In order for seeds to germinate and survive the tree must obviously have non-shedding bark. In addition, moisture and light levels must be right and the outer surface of the tree not contain mobile substances which are toxins for the orchid roots. However, a number of trees in the vicinity of the preferred trees mentioned above would meet these criteria. Horticulturally the above orchids, for example, can be grown on a wide range of substrates perfectly well providing they are watered and fertilised appropriately given the particular substrate. The question then remains as to why there are these clear in-situ substrate preferences. Obviously where the plants are found in-situ is where the seeds are most likely to successfully germinate and that can only be where the mycorrhizal fungi are located. If the right fungi are not present then germination will not occur even if all other conditions are right for the growth of autotrophic (photosynthetic) seedlings.

I put the above proposition to Professor David Benzing (at the Oberlin Science Centre, Ohio, USA) who has published a significant amount of material on mycorrhizal relationships mainly in *Selbyana* – e-mail communication Jan 2009) and to quote him: "I'm not convinced that fungi play a significant role in the nutrition of adult epiphytic orchids or that they likely influence host choice by occurring on certain kinds of trees. Epiphytic orchids require fungi to germinate, but probably what they need is not terribly substrate specific." He felt that in-situ substrate preferences were more probably due to a mix of chemical and physical characteristics for those substrates.

On the other hand, Dr John Dearnaley at the University of Southern Queensland (e-mail communication Jan 2009) had a different view. He believes that the availability of suitable fungi (subject to other factors being right – see above) is the overriding factor which drives substrate choice. The issue really is what substrates support the required fungi. This in turn indicates a continuum of dependence of the orchid on the mycorrhizal fungi and in turn on the tree (termed phorophyte).

Substrate – Mycorrhizal Fungus - Orchid

What is known about this? Dr Jacoba Ruinen, an Indonesian scientist, in at least one case produced evidence that hyphae from mycorrhiza extended into the substrate as well as into the roots of an orchid growing on this substrate (Arditti, 1992) suggesting a chain of interdependence. Further such findings have more recently been reported (Dearnaley, 2007 and Suarez et al, 2008) which emphasise the importance of preserving host tree species in the bush. Without these, viable in-situ germination will be much less likely as suitable fungi will be unavailable. Finally, Suarez et al (2008) cite references claiming that mycorrhizal fungi have an on-going important role in the growth of mature, green exotic epiphytic species in-situ. These fungi would assist the orchid in obtaining all the inorganic nutrients it requires as a mature plant (as mentioned earlier).

Further Evidence for Symbiosis Beyond the Seedling Stage

Once the seedling becomes fully photosynthetic (self sustaining/autotrophic) some believe that the mycorrhizal fungi are no longer required (eg Wood, 2006). However, Boddington & Dearnaley (2009, in press) have, for example, found mycorrhizal fungi associated with the roots of mature in-situ *Dendrobium speciosum* var. *grandiflorum.* This and other evidence (Dearnaley, 2007) suggest that in-situ epiphytes may fall into one of three categories:

- those orchid species which require mycorrhizal fungi throughout their life (these obviously include most if not all deciduous terrestrial orchids – these orchids are termed myco-heterotrophic). I personally suspect it could include a range of epiphytes.

- those species which do not require the fungi beyond the initial seedling development stage (a range of epiphytes). These orchids in-situ are fully autotrophic.

- those species which continue to draw benefit from mycorrhizal fungi as well as from photosynthesis and external nutrients and water (so called mixotrophic orchids

– Dearnaley, 2007). This may be true for *Dendrobium speciosum* in some situations (based on Boddington & Dearnaley, 2009 in press).

Horticultural Considerations

Raising Seedlings in Flask (ie ex situ)

Between 1849 and 1921 the only known method of germinating orchid seeds ex situ was via the use of mycorrhizal fungi (symbiotic germination). The methods for doing this were developed by John Ramsbottom in the United Kingdom and were commercialised (Arditti, 1992). However, the methods were cumbersome and prone to failure. In the early 1920's asymbiotic procedures were developed using specially formulated nutrient media (Knudson B developed in 1922, Knudson C in 1946 and Vacin & Went 1949 with many others being developed since) (Arditti, 1992).

However, the above still raises the question of whether a combined approach could be of benefit in some situations. For example, the successful meristem culture of *Dendrobium speciosum* has not been possible to date. However, both David Benzing (e-mail – Jan 2009) and Andre Cleghorn (Flora Laboratories, Melb 2009) do not believe that mycorrhizal fungi could provide a substitute or support for the complex mix of organic compounds and hormones that proliferating meristems need to become whole plants. The culture of *Dendrobium speciosum* seed in flask with the right nutrient mix is not a problem, however. Therefore the techniques to genetically replicate outstanding *Den. speciosum* plants, while remaining unknown right now, will likely not involve a combination of symbiotic and asymbiotic methods.

Bush Plants and Plants from Flask

The statement has been made (Light, 2003) that bush collected epiphytes are less likely to do well compared to the same species from flask i.e. that strong seedlings from flask will ultimately do better. In particular cases (perhaps few) this may suggest that interruption of symbiosis (which may be happening for a bush plant) could have negative consequences for the plant metabolic pathways which are never fully recovered compared to a plant germinated from the start using synthetic nutrients.

Survival of Orchids ex Situ

Gerry Walsh (1997) wrote a brief article in *The Orchadian* on the lifespan of an orchid. He cites *Dendrobium kingianum* (eg clonal examples 'Albert West' and 'Corrigans Red') and *D. speciosum* (eg clones 'Windermere' and 'National White') as long livers. Other sympodial orchids also survive and grow well. However, many monopodial orchids such as *Sarcochilus australis* may do well for a while then die inexplicably. It could be that mycorrhizal fungi are essential in order to successfully grow these orchids over the long term. In order to test that, a bush substrate liked by *Sarcochilus australis* should be used (eg the current bush *Caprosma quadrifida*) together of course with the shaded conditions and humidity levels required. Other stick epiphytes may depend particularly strongly on mycorrhizal associations for their survival – an area of research which has hardly been looked into.

Mycorrhizal Fungi and Cultivation ex Situ

Having made the earlier comments, in most cases Australian epiphytic orchids grow very well on all sorts of substrates ex situ. If the plant is in a pot then all sorts of growing media and mixes can be used. The important thing is that the right watering, fertilising, light, etc (cultural factors) are established which are appropriate for the substrate or media chosen. As the plants are capable of photosynthesis and have their requirements for inorganic nutrients met (through the appropriate application of fertiliser), all their nutritional and survival needs are met. In short, under horticultural conditions, symbiosis is not necessary nor does there appear to be any situation where such a dependency would lead to improved results (other than the speculation under the heading 'Survival of Orchids ex Situ' above – an area for further research and investigation).

Identification of Mycorrhizal Fungi

Much less work has been done in this area in the case of Australian epiphytic orchids compared to the terrestrials. However, the fungus genus *Tulasnella* appears to be a key one involved in the germination of epiphyte seeds in-situ. The following mycorrhizal associations have been identified (Table below).

Table Plant – mycorrhizal associations

Plant	**Mycorrhiza**	**Reference**
Dendrobium tetragonum	*Tulasnella asymmetrica*	Currah et al, 1997
Cymbidium canaliculatum	*Tulasnella calospora;* *Ceratobasidium* sp.	Currah et al, 1997
Dendrobium affine (syn *Dendrobium dicuphum*)	*Tulasnella calospora*	Arditti, 1992
Dendrobium speciosum var. *grandiflorum* (ex Redwood Park near Toowoomba, Qld)	*Tulasnella* sp.	Boddington & Dearnaley, in-press, 2009

References

Arditti, 1992. *Fundamentals of Orchid Biology* Ch.9 Mycorrhiza pp419-450 New York: John Wiley & Sons

Benzing, 2009. personal e-mail January and February.

Boddington & Dearnaley, 2009 in press with *The Proceedings of the Royal Society of Queensland*. 'Morphological and Molecular Identification of Fungal Endophytes from Roots of *Dendrobium speciosum*.'

Chah website, Jan 2009. (Council of Heads of Australian Herbaria): www.chah.gov.au 'Introduction to Australian Orchidaceae'

Cleghorn, Andre, 2009. personal communication, January

Currah et al, 1997. 'Fungi from Orchid Mycorrhizas' p117 in *Orchid Reviews & Perspectives* Vol VII ed Joseph Arditti and Alec Pridgeon. Dordrecht: Kluver Academic Publishers.

Dearnaley, 2007. 'Further Advances in Orchid Mycorrhizal Research, *Mycorrhiza* 17 , pp475-486.

Dearnaley, 2009. personal e-mail January and February.

Gowland et al, 2007. 'Understanding the Distribution of Three Species of Epiphytic Orchids in Temperate Australian Rainforest by Investigation of their Host and Fungal Associations' *Lankesteriana* 7 , no 1-2, pp44-46 [from Proceedings of the 3rd International Orchid Congress IOCC, San Jose, Costa Rica]

Hadley, 1982. 'Orchid Mycorrhiza' p84 (CH 3) in *Orchid Biology Reviews & Perspectives* Vol II ed by Joseph Arditti Ithaca: Comstock Publishing Associates (a division of Cornell University Press)

Jones, 2006. *A Complete Guide to Native Orchids of Australia* Sydney: Reed New Holland Publishers

Light, 2003. 'Orchid Roots and Mycorrhizae – Questions and some Answers' *Orchids Australia* October issue, pp18-20.

Rasmussen, 1995. *Terrestrial Orchids from Seed to Mycotropic Plant.* Cambridge: Cambridge University Press.

Suarez et al, 2008. 'Members of Sebacinales subgroup B form Mycorrhizae with Epiphytic Orchids in a Neotropical Mountain Rainforest', *Mycological Progress* 7, pp75-85.

Upton, 1989. *Dendrobium Orchids of Australia* Knoxfield: Houghton Mifflin Australia Pty Ltd.

Walsh, 1997. 'The Lifespan of an Orchid' *The Orchadian* 12, no 5, Sept, pp206-209.

Wood, 2006. *The Dendrobiums* Liechtenstein: ARG Gantner Verlag

Other references (books) of a general nature were referred to, but they were not at variance with the above – hence my use of 'eg' when citing some of the references in the text.

Acknowledgements

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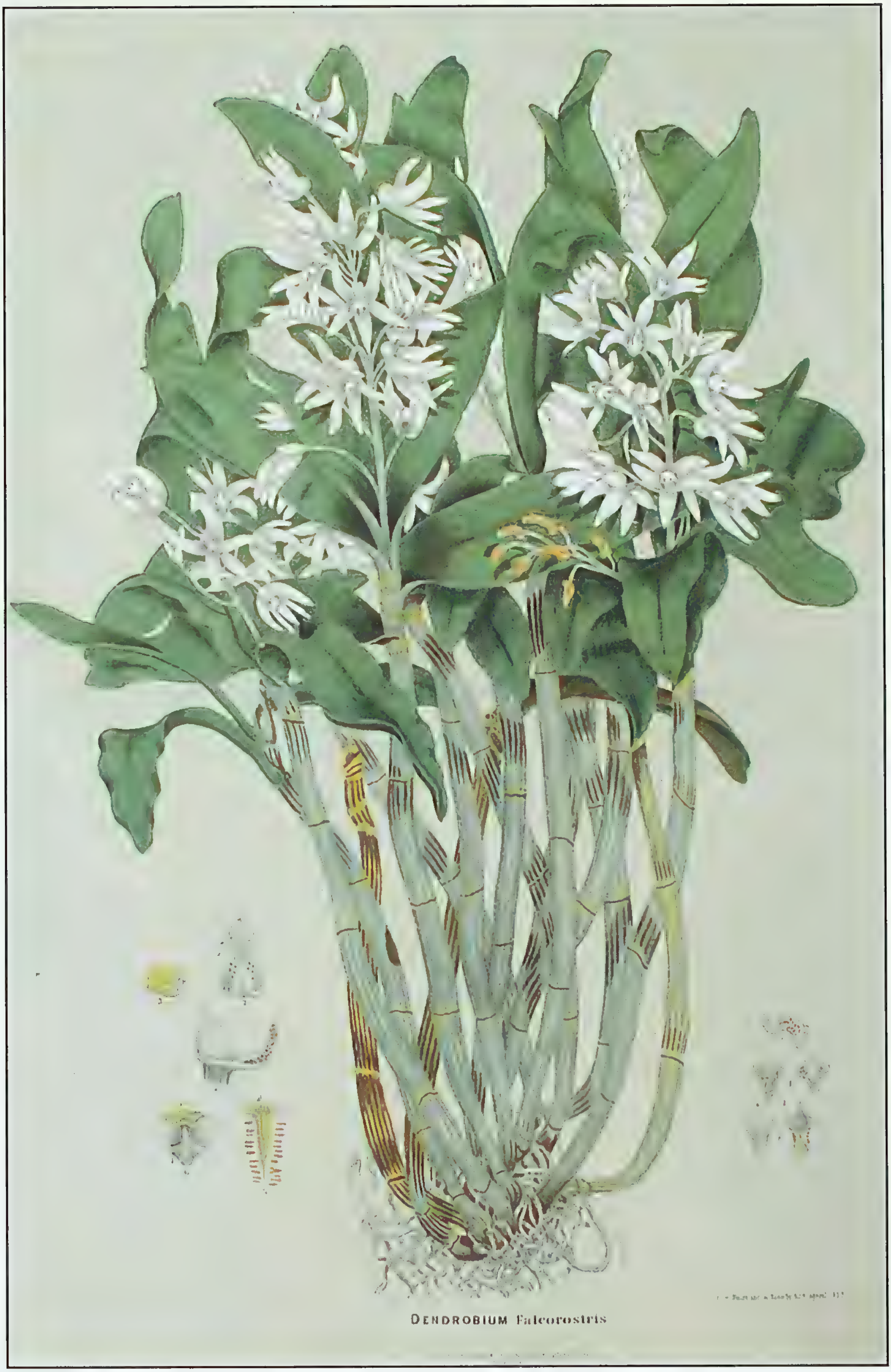

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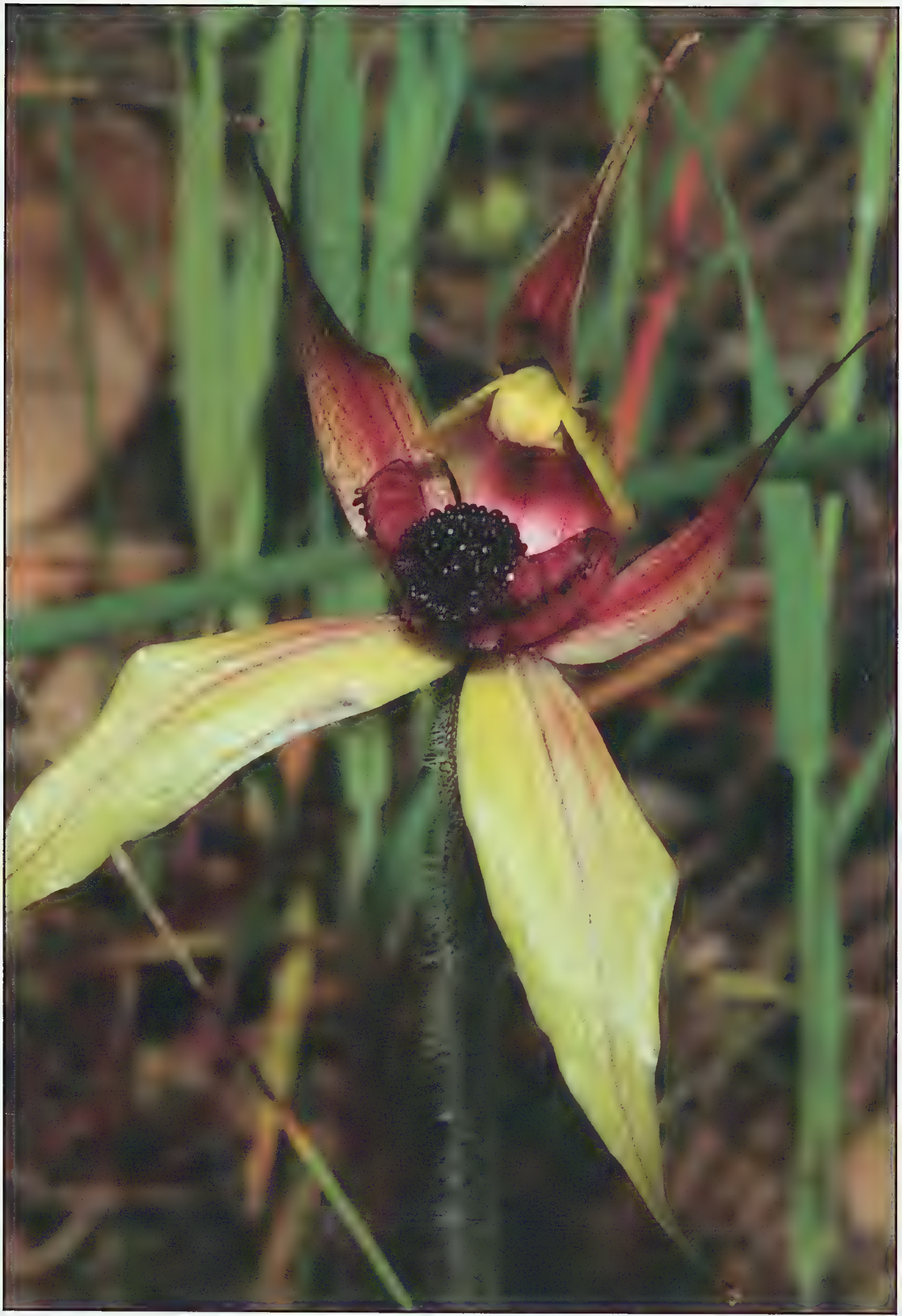

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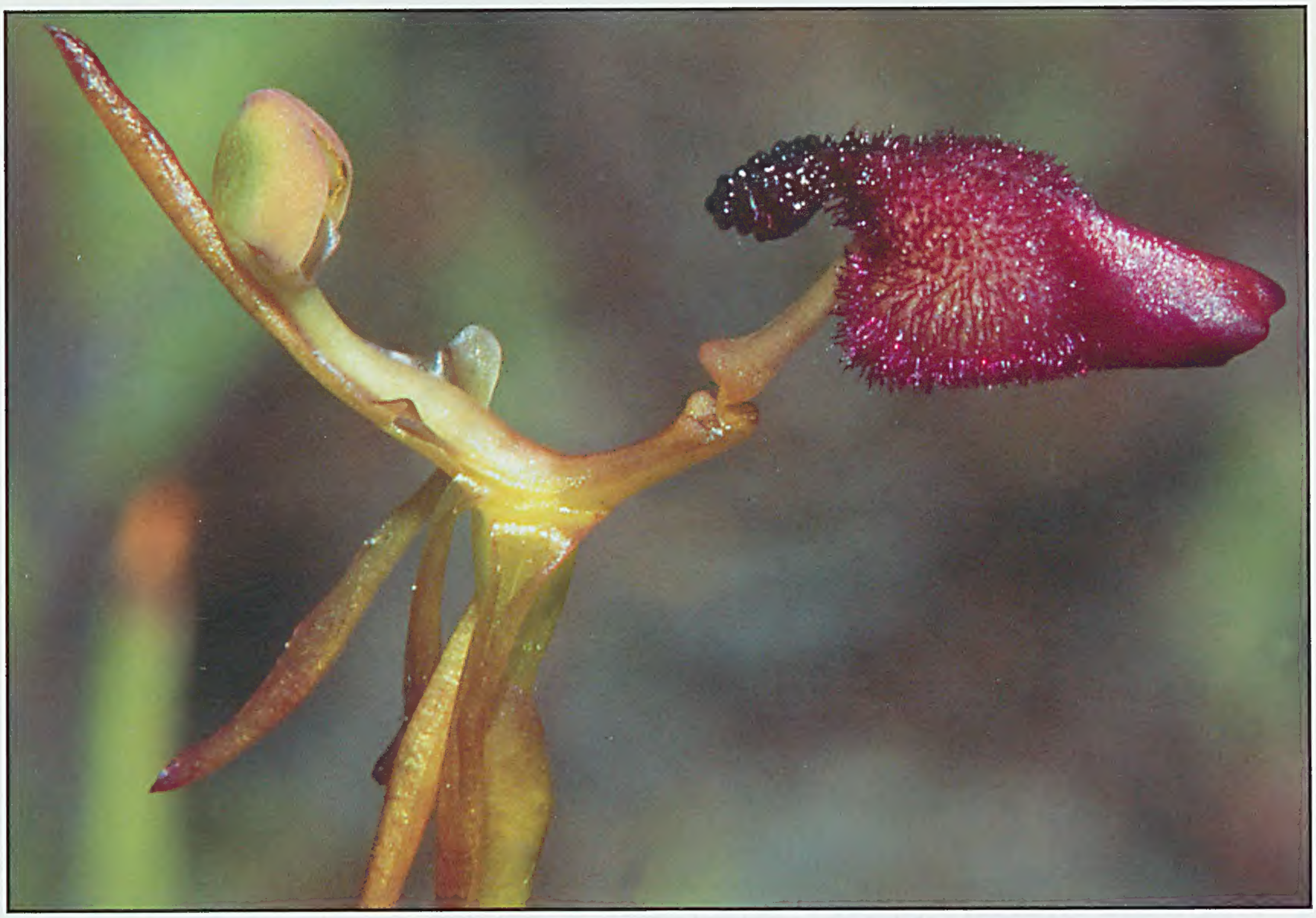

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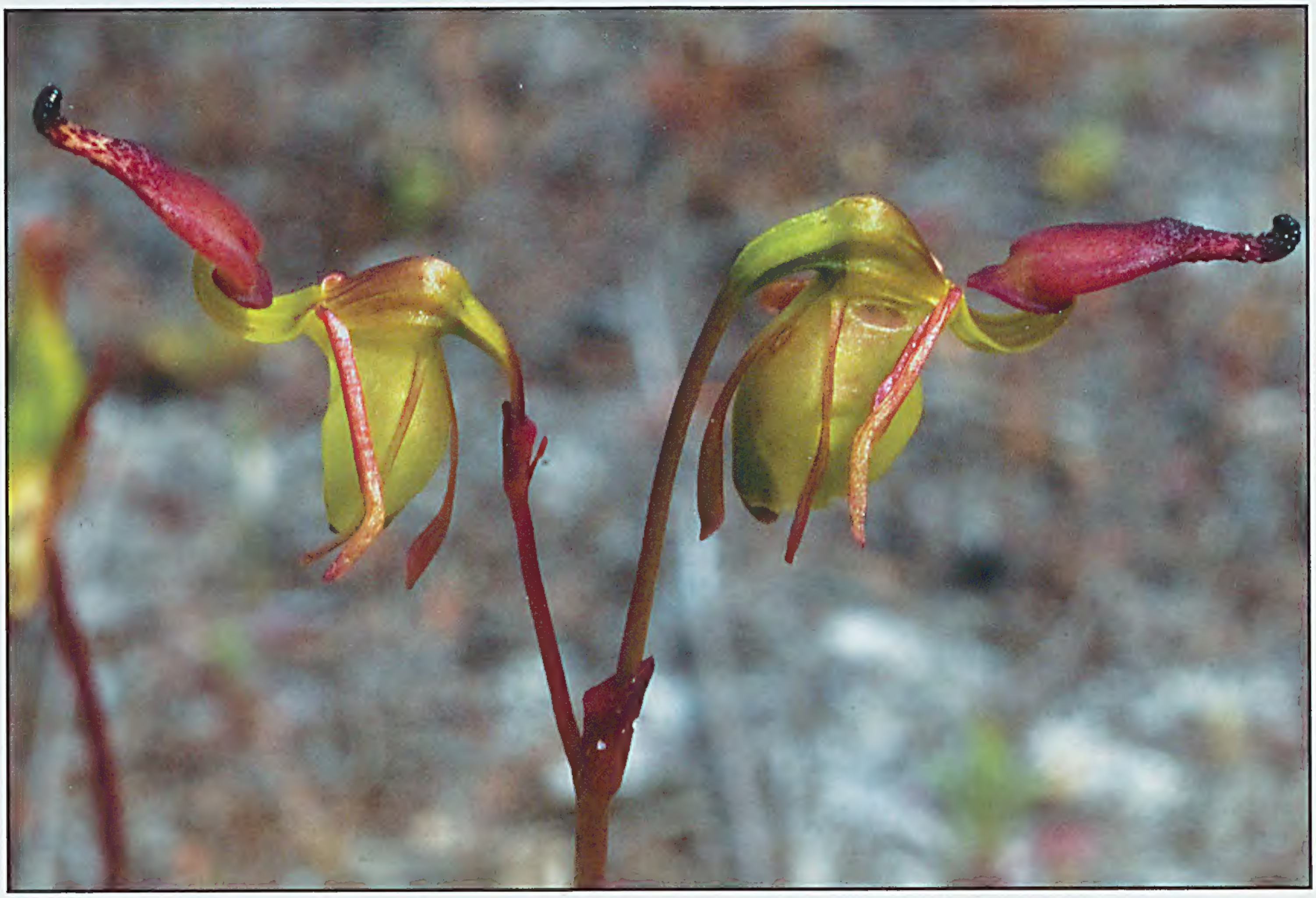

Sullivania nigrita

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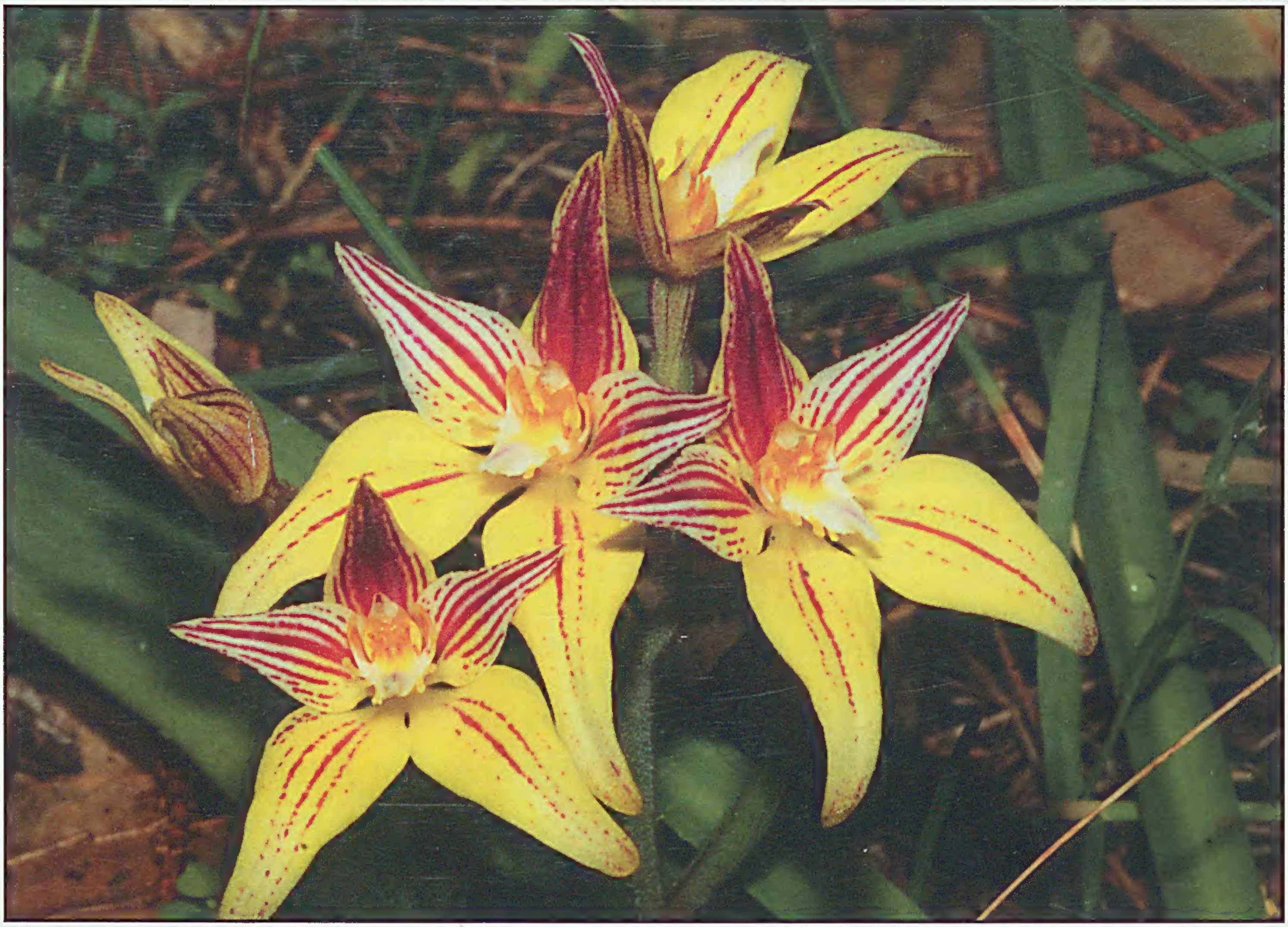

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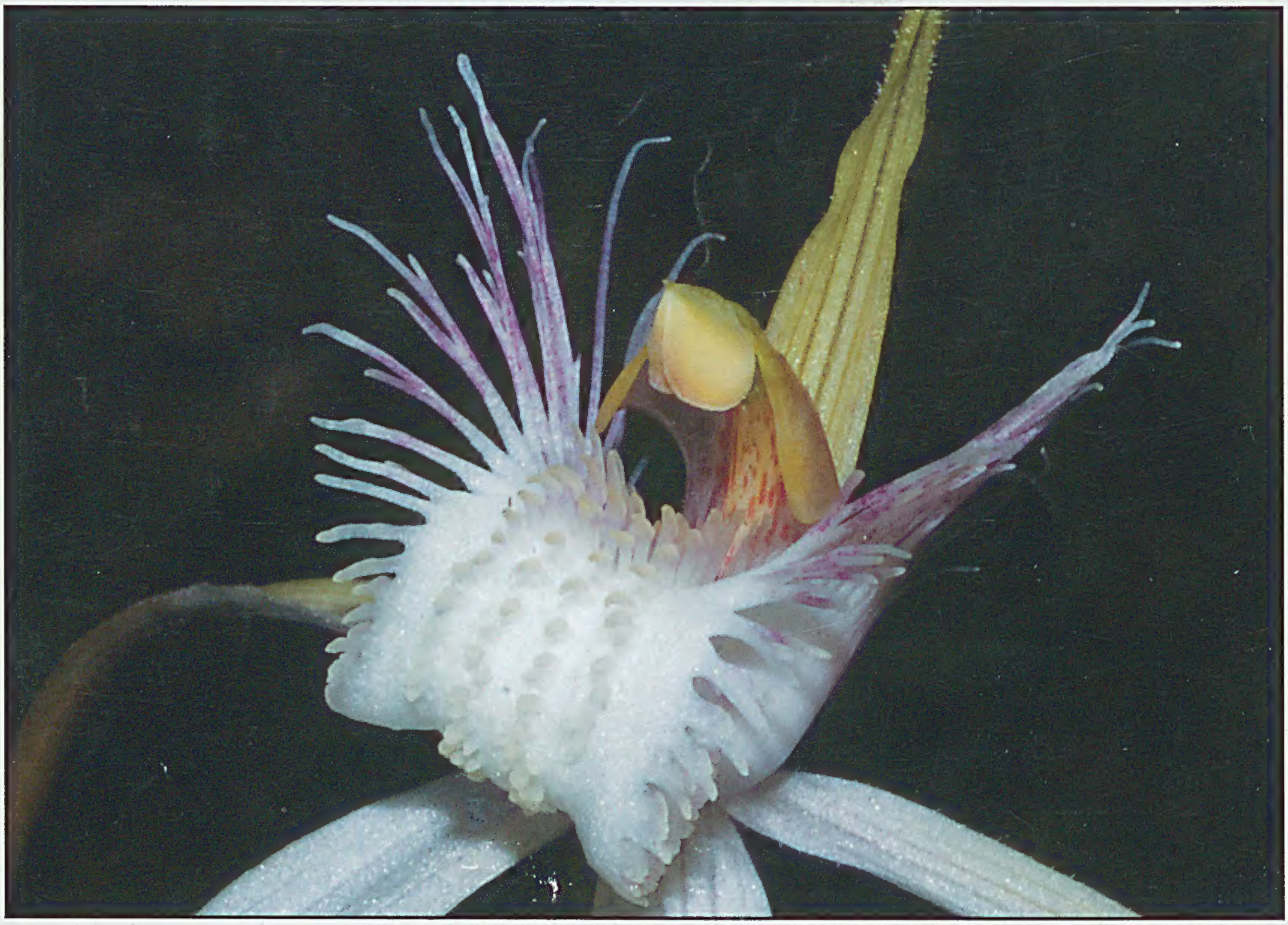

Arachnorchis speciosa.

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